LIBRARY OF CONGRESS
COPYRIGHT
SEP 10 1888
538 T
WASHINGTON.

PRICE 15 CENTS.

SEPTEMBER 8, 1888.

THE AMERICAN ARCHITECT AND BUILDING NEWS

VOL. XXIV. REGULAR EDITION NO. 663.

ARCHITECTURE

ENGINEERING

DECORATION

CONSTRUCTION

TICKNOR & COMPANY

BOSTON MASS.

CONTENTS.

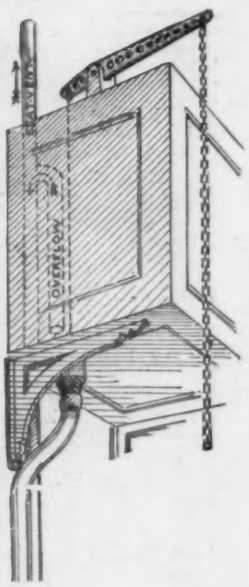
Editorial Summary.
Builders' Hardware.—V.
Italian Cities. IV.—Milan.—II.
Ancient and Modern Light-houses.—XXIII.
Mediæval Houses.—III.
Communications.
Notes and Clippings.
Trade Surveys.

ILLUSTRATIONS.

Building of the Hasty-Pudding Club, Cambridge, Mass.
(Gelatine Print issued only with Imperial Edition.)
Alterations to Houses at Boston, Mass
Views in Milan, Italy.
House at "Windy Gates."
House of Mr. W. H. Wray, Esq.

THE

SANITAS WATER CLOSET



The "SANITAS" PATENT WATER CLOSET has the simplicity of the Short Hopper, all the Sanitary advantages and conveniences of the best improved modern closets, and others peculiar to itself in being antisiphonic, quick-acting, self-sealing, free from spattering or waste of water, and, when properly set, almost noiseless in operation.

The supply-pipe between the cistern and the closet stands permanently full of water, and, discharging below the level of the standing water in the bowl, the action is instantaneous and the noise of flushing is deadened, so that when properly set and with the cover down and toilet-room door closed, no sound can be heard from without. The water is held in the supply-pipe by atmospheric pressure and will instantly restore the trap seal should it at any time be lowered by evaporation or siphonage.

SANITAS MANUFACTURING CO.,

MAIN OFFICE: 207 TREMONT STREET, BOSTON, MASS.

Branch Offices: 64 Gold Street, New York, N. Y. 229 Walnut Street, Cincinnati, O. 47 to 49 Dearborn Street, Chicago Ill.
SOLE AGENTS FOR CALIFORNIA: ARNOLD & CO., 40 CALIFORNIA STREET, SAN FRANCISCO.

THE AMERICAN ARCHITECT AND BUILDING NEWS.

VOL. XXIV. Copyright, 1888, by TICKNOR & COMPANY, Boston, Mass. No. 663.

SEPTEMBER 8, 1888.

Entered at the Post-Office at Boston as second-class matter.

CONTENTS

SUMMARY: —
Architects abandoning their Profession in favor of Salaried Positions. — Architects' Incomes in this Country and Abroad. — The Pennsylvania Railroad to replace its Iron Bridges with ones of Stone. — The Discoloration of Granite. — A Roumanian Legend. — The Prize of Rome for 1888. — Counterfeit Antiquities. 105
BUILDERS' HARDWARE. — V. 107
ITALIAN CITIES. — IV. — MILAN. 109
ILLUSTRATIONS: —
Building of the Hasty-Pudding Club, Cambridge, Mass. — Alterations to Houses of Messrs. A. T. Lyman and M. B. Inches, Boston, Mass. — Views in Milan, Italy: The Cathedral: The Arena: S. Maria delle Grazie: The Roman Colonnade. — House of J. W. Jenkins, Jr., at "Windy Gates" — House of W. H. Wray, Esq., New York, N. Y. 111
ANCIENT AND MODERN LIGHT-HOUSES. — XXIII. 111
MEDIÆVAL HOUSES. — III. 114
COMMUNICATIONS: —
A Correction. — The Effect of Lead Plates in Masonry. . . 115
NOTES AND CLIPPINGS. 116
TRADE SURVEYS. 116

SOME little comment has been made upon an article published in a Boston newspaper, which mentioned that a certain architect of considerable note in that city had closed his office, and abandoned his profession, to accept a Government position, at a salary of twenty-five hundred dollars a year; while two others had made application for official positions at salaries of fifteen hundred dollars a year. The newspapers seem to think that architects must be persons of very little courage or manliness, if three of them in a single city, who ought, as the journal which published the story informs us, to be "able to earn an income of five thousand dollars a year," are willing to give up this attractive prospect for a certainty of half or a third of that sum; and it seems only fair to come to their defence by pointing out that the probability that any architect in an American town will ever be able to earn five thousand dollars a year by the practice of his profession is extremely small, and that the gentlemen in question, who were more likely to understand the circumstances than any one else, probably did what was most prudent for them.

IT would do no harm to have the public understand a little better than it now does the smallness of the pecuniary rewards which come to architects. There is no profession whose members are so savagely plundered and cheated by those whom they try their best to serve, yet there is perhaps no profession, except that of the ministry, whose members, in this country, at least, have incomes so uniformly modest. Although the great competition among lawyers keeps the younger ones poor for a few years, they may look forward hopefully, if they persevere, to revenues from fees and trusts which will make them rich before their middle life is past, while even physicians, whose income is said to be, on an average, smaller than that of any other professional men, may reasonably hope for a practice of ten or twelve thousand dollars a year as the result of exceptional ability and industry. With architects the state of affairs is very different. We are strongly inclined to believe that the number of architects in each large American city whose income from their profession amounts, on an average, to five thousand dollars a year can be reckoned on the fingers of one hand, and that the few architects who earn more than this are not always those whose careers do most to bring credit to their profession, or to advance the cause of art. Why this should be so, it would be interesting to inquire. The civil engineers, whose method of service resembles that of architects, are much more successful in getting properly rewarded for it. One reason for this is that important engineering works are always left under control of their designers, who are paid in proportion to the skill and responsibility involved, while the execution of a large building is in this country accompanied with an amount of gratuitous interference and imposition which reduce the margin which an architect can save for himself after paying his draughtsmen to very small proportions, even if he has not been bullied or deceived into accepting an inadequate compensation at the outset. It is impossible for us, Americans, not to feel a little envy of the more prosperous practice of architects abroad. It is true that competition is greater there, but the rewards of the successful men are also far greater. As the cost of building is greater in Europe than in this country, the architect's income from commissions of the same number and importance is larger there than here, while the expense of living is much less. Moreover, the excessively costly offices maintained here, with their scores of draughtsmen at salaries ranging from ten to a hundred dollars a week, are unknown abroad, where an architect of reputation can have his choice of articled pupils who render him skilful and enthusiastic assistance, and pay him a large sum for the privilege of doing so; and, distances being comparatively trifling, while clerks-of-works are always kept, at the owner's expense, on buildings of importance, a busy architect, instead of having to spend almost his whole time in racing around the country in terror lest one of his buildings should come to grief before he can see it again, has plenty of leisure to do his own designing, even to the details of the mouldings and sculpture. Again, not only are the architect's office expenses light, but his pay is more certain, and, in important works, usually greater. There are few architects in this country who could command the full commission of five per cent for a building costing ten or twelve million dollars, which is given as a matter of course abroad to any architect who should show himself capable of designing such a structure; and if it were given here, it would be so loaded with conditions compelling the architect to pay the clerk-of-works, or to give bonds for the completion of the building within the contract price, or a dozen other matters, as to reduce the architect's profit to a small sum, and burden him with exactions which would prevent him from doing more profitable work. In England a man like Street has no difficulty in carrying on simultaneously the Law Courts and several other important buildings in different parts of the country, making all the perspective studies, and, in the case of the Law Courts, at least, all the drawings for mouldings, capitals and details of every kind, with his own hand, reserving at the same time leisure for daily exercise and recreation, and, in the hot season, leaving his buildings, safe in the charge of a clerk-of-works, for whose actions he assumes no responsibility, to enjoy a month or two of sketching on the Continent. With us such a professional life would be utterly out of the question. The only way in which an architect here could get a month's vacation from his business in summer would be either to have no business, or to divide it with a partner; yet the reward of the best American architect's years of unremitting toil and anxiety, if he is so fortunate as to find constant employment, is a decent living for himself and his family, while Street, Scott, Waterhouse and others, by middle life, have become very rich, Royal Academicians, and distinguished members of the most distinguished society, and their rivals on the Continent get, in addition, orders, and titles of nobility.

THE public is certainly to be congratulated on the resolution which has recently been taken by the managers of the Pennsylvania Railroad, to rebuild all its bridges of short span in brick or stone, instead of iron. The weight of locomotives has increased so much of late years that iron bridges which were built with a large margin of safety are now dangerously tried by the trains passing over them, and the expense of inspection and repair of iron bridges represents a large interest on their cost. For these reasons the engineers of the road have decided that brick or stone arches, although much more expensive in the first instance than iron trusses, will be cheaper, as well as safer, in the end. Aside from their greater safety, however, bridges of masonry have the æsthetic advantage of being usually interesting, and often very beautiful objects, while iron truss bridges have never yet been endowed with anything more than an engineering attraction. The roughest stone arch across a roadway presents a beautiful combination of lines, a fine contrast of light and shadow, and a

picturesque effect of landscape beyond, together with an expression of quiet durability which is more needed in our architecture than any other artistic quality, and the more important examples, such as the viaducts which are sure to be soon required at the entrance of railways into towns, may become works of the highest art. In many cases they are likely to be made so, if we may judge from the present tendency of railroad managers to seek the assistance of architects for giving their permanent structures an attractive air. Already our country railway-stations, under professional care, are fast becoming transformed from hideous sheds, covered with clapboards, into charming buildings of stone, picturesque, solid and convenient, often quite richly decorated, and generally surrounded by pretty and well-kept gardens. The better class of these new stations in this country are far more beautiful than those of foreign roads, and if the design of the bridges could be brought up to that of the stations, the line of every well-managed road would furnish a route of considerable artistic interest.

M. DETAIN sends to *La Semaine des Constructeurs* one of his sensible letters on granite, or rather on the causes of discoloration of granite by rust, and the methods of preventing and removing this discoloration. In most granite countries a certain amount of iron is scattered through the rocks beneath the surface of the earth, usually in the form of sulphide, crystallized in the well-known cubical, gold-colored particles of iron pyrites. The crystals of pyrites occur in many other rocks besides granite, more particularly, perhaps, in slate and coal, and are frequently supposed to be gold. Wherever they occur, they decompose on exposure to the weather, leaving ultimately a free oxide of iron, which is washed by rain over the surface of the stone. Many white or mottled marbles also contain iron, which slowly imparts to the surface, under the action of the weather, a warm burnt-sienna color. This is not a serious disadvantage to marble, but in granite the iron stain combines disagreeably with the natural color of the stone, and granites containing iron particles should be rejected. According to M. Détain, the French granites of a dark-gray color are rarely, if ever, affected by rust. Those with white ground are more apt to contain iron, but are tolerably safe; while those with pink or red ground are almost sure to rust. With us, red granites are no more subject to rust stains than others. There are some red granites which contain iron, but there is at least an equal number of gray and white stones with iron particles in them, and as these soon assume an unpleasant appearance on exposure, new granites should be tested. The best test, and one which cannot be too strongly recommended to architects who have occasion to try a new stone, consists in a visit to the quarry, where its merits and defects may, with a little care, be ascertained with certainty; but washing the suspected stone with muriatic acid, and allowing the acid to dry on, will often bring out the color of iron. Singularly enough, the same means answers for removing the rust stains which have already formed on a stone. The muriatic acid readily dissolves the rust, and if it is then washed off with plenty of clear water, the stain will disappear until atmospheric influences have produced a new coat.

WE do not often have occasion to reproduce legends in these pages, and legends do not often have architects for heroes, but having come upon a pretty one which will be new, we imagine, to most of our readers, we reproduce it for hot-weather entertainment. The story is Roumanian, and is to be found in Madame Gerard's "*Land beyond the Forest.*" According to the ballads familiar all over the province, the great Hospodar Negru, one of the principal characters in Roumanian history, while detained in Constantinople as a hostage, occupied himself in studying Oriental architecture, and became so expert that he himself directed the building of a great mosque, which had nine hundred and ninety-nine windows, and three hundred and sixty-six minarets. The Sultan was so delighted with his success that he set him at liberty, and presented him with all the rich materials left over from the building of the mosque, so that he might construct a church with them in his native country. Negru took with him, therefore, not only the materials, but nine master masons, and the Greek architect Manolli. On reaching home, Negru, according to the legend, goes in search of a site for his new church. A shepherd boy tells him that near the River Arghisch, in a dark thicket, he has seen an old ruined wall, at sight of which his dogs fled, howling. Negru looks upon this as a supernatural direction, and leads his band of masons to the spot. Work is immediately begun, but the Christian ground refuses to support the Moslem materials, and whatever they build during the day is overthrown at night. The Prince is furious, threatening the masons with instant death if they do not build the wall so it will stand, and they are in despair, when Manolli has a dream, in which he is told that if the first woman who comes near the next day is seized and built into the walls the celestial wrath will be appeased, and the work will stand. On waking, he relates his dream to his assistants, and binds them by a mutual oath to obey the divine direction. At sunrise Manolli mounts the staging, fearing to see some victim. He hears sweet singing, and a little way off his eyes fall upon his wife, Annika, bringing him bread and wine for his breakfast. In terror he falls upon his knees and prays for a flood to keep her from reaching the building. His prayer is granted, and a torrent rushes down the river-bed, but Annika bravely presses on, wading through the stream to reach her husband. Manolli prays again for a hurricane, and again his prayer is granted, and a furious wind bends the pine trees, almost carrying Annika away, but she resists and struggles on, until she reaches the walls. The other masons, relieved from their own fears, piously rejoice at this heaven-sent sacrifice, and Manolli, sadly kissing his wife, carries her up to the scaffolding, and places her in a niche. The masons tell her that they are going to pretend to build her in as a joke, and Annika stands quietly until she is held fast. Then she cries to Manolli to release her, but the masons work on relentlessly, and the walls rise rapidly, while her dying voice still sounds from within them. The Hospodar, finding the work going on so prosperously, asks the men if they could ever build a still more lofty and beautiful church. At their reply that they think they could do so, he begins to fear that they will go and work for some of his rival princes, and makes sure of preventing them by removing the ladders. The men, finding no other way to escape, make for themselves wings out of the shingles provided for the roof, and jump down, but the wings fail to work as they should, and the nine masons on striking the ground are killed, and turned into stones. Manolli also leaps, but at the moment, hearing from within the wall the voice of his poor wife calling to him, he bursts into a flood of tears, and striking the ground like the others, he becomes a spring of water, which is still flowing, and bears to this day the name of Manolli's Well.

THE Prize of Rome for 1888 has been awarded to M. Joseph-Albert Tournaire, of Nice, a pupil of M. André.

We find an interesting illustration of the system of the Ecole des Beaux-Arts in the fact that M. Tournaire was second in the competition for the Grand Prize in 1882, and, after so nearly winning it once, has worked patiently for six years before his final success. Judging from the time usually necessary to enable a student in the school to win even a second Grand Prize, his course must have lasted at least ten years, and he has five years more of student life before him at the Villa Medici. For all this M. Tournaire, who is now in his twenty-seventh year, is rather a young man to have reached the highest academical honor, and he must have been an exceptionally brilliant student to gain the second place six years ago. The second in rank this year is M. Sortais, pupil of MM. Daumet and Girault, who gained the third position in 1886; and the third is M. Huguet, pupil of M. Blondel.

SOME venders of modern antiquities have come to grief in Paris, greatly to the satisfaction of collectors. It seems that some time ago a quantity of objects of antique art in gold and silver were imported into France from Germany, where they had just been made. The French custom-house officers, not knowing of any law to justify them in seizing the counterfeits, as they had not been offered for sale, and were presented to them under their true character, as German manufactures, were obliged to be contented with stamping on each a mark by which it might be subsequently known. Sometime later, specimens were ascertained to have been sold, in which this mark had been altered into a sort of antique cipher, and the sellers, three Parisian bric-à-brac dealers, were arrested and heavily fined.

BUILDERS' HARDWARE.[1] — V.

BOLTS.

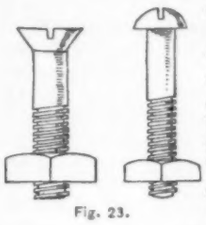


Fig. 23.

ASIDE from the coach or lag screws, and the stair-rail bolts already described, the only constructive bolts used by the builder are such as are necessary in joining header and trimmer beams. These are similar to the stair-rail bolts, but heavier and less finished. They are often made to order, but a few sizes are kept in stock by some dealers. Ordinarily $\frac{1}{2}$ to 1 inch bolts are used, 8 to 24 inches long, with a square head on one end and a thread and square nut at the other. In any other cases requiring the use of constructive bolts, lag-screws are generally found to answer every purpose, though stove-bolts, Figure 23, are sometimes useful. These are made with flat or round heads. They are manufactured in six diameters, from $\frac{5}{32}$ to $\frac{5}{8}$ inch, and thirty-two lengths, from $\frac{5}{8}$-inch to 7 inches. The manufacturers' list-prices are from $0.85 to $4.20 per hundred. Sink-bolts are similar to the stove-bolts except that the shank is threaded the whole length, and provided with two nuts. Tire-bolts are like flat-headed stove-bolts, but are without the cross-cut in the head. Many other forms of bolts are in the market, but even the foregoing are rarely used by builders.

DOOR-BOLTS.

Figure 24 shows the most common form of wrought-iron door-bolt, designated specifically as a "barrel-bolt." This is made to screw onto the face of the door. The jamb-staple may be plain, as in Figure 24; bent, Figure 25; or necked, Figure 26. The latter is for a door swinging out, which is to be bolted on the inside. All of these forms are likewise made in cast brass. The iron bolts may be japanned, tinned or bronzed, and the knobs are sometimes nickel-plated, tinned, or made of brass or porcelain. Neck-bolts, Figure 27, are used when the bolt-plate or staple cannot be put directly on the line of the face of the door. The style shown by the illustration is that manufactured by the Stanley Works, and is made additionally strong by a central rod running into the bolt and riveted to the edge of the bolt-plate as shown by the figure. A similar style of bolt with a flat bar and a raised end instead of a knob, Figure 28, has a flat spring between the bolt and the plate, serving to keep the former in position.

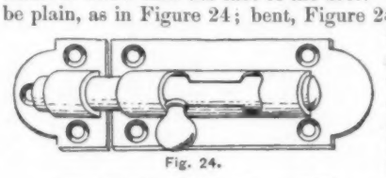


Fig. 24.

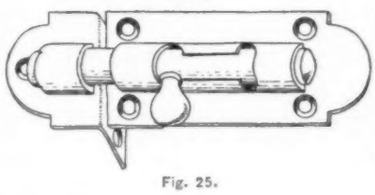


Fig. 25.

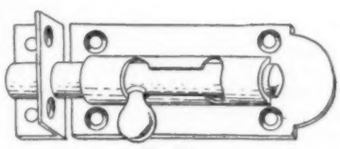
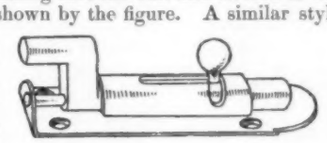


Fig. 26.



27.

Figure 29 shows a form which is designated as a mosquito-bar bolt, and is used for a number of light purposes. It is made without any jamb-staple.

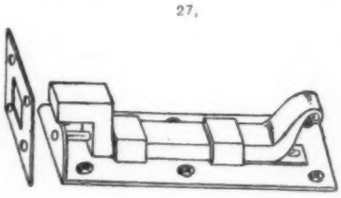


Fig. 28.

Excepting Figure 28, the foregoing bolts are made without any springs. Much the same patterns are found in the market under the designation of spring-bolts, the bolt being held either open or shut by means of a spring inserted under the bolt against the bolt-plate. These are in a number of varieties, including neck-bolts, straight-bolts, square or round bolts, with porcelain knobs, brass knobs, etc. Figure 30 shows a form of square spring-bolt manufactured by the Stanley Works. There is also another form, Figure 31, in which the spring is on one side of the bolt, the notch in the shank holding the bolt either open or shut.

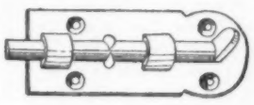


Fig. 29.

Straight cupboard-bolts, Figure 32, and flat cupboard-bolts, Figure 33, are manufactured in a variety of forms of which those shown are types. They are finished in the usual variety of styles. Figure 34 shows what is designated as a ship-bolt. Figure 35 is a variety of side flush-bolt adapted for chests, desk-tops, etc.

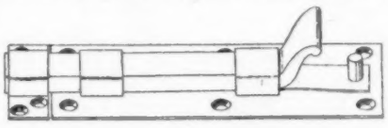


Fig. 30.

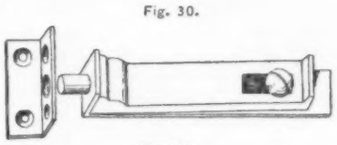


Fig. 32.

Figure 36 and Figure 37 are two forms of bookcase-bolts. The former is screwed flush on the edge of the standing-door at the top, while a flat plate is attached to the edge of the swinging-door. On closing the latter, the brass plate strikes on the knob of the bolt and throws the bolt up into the door-soffit, the knob shank following the oblique cut in the plate; a

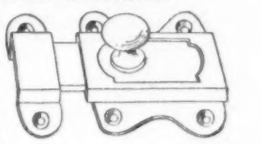


Fig. 33.

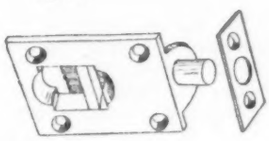


Fig. 34.

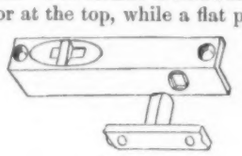


Fig. 35.

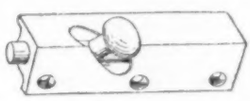


Fig. 36.

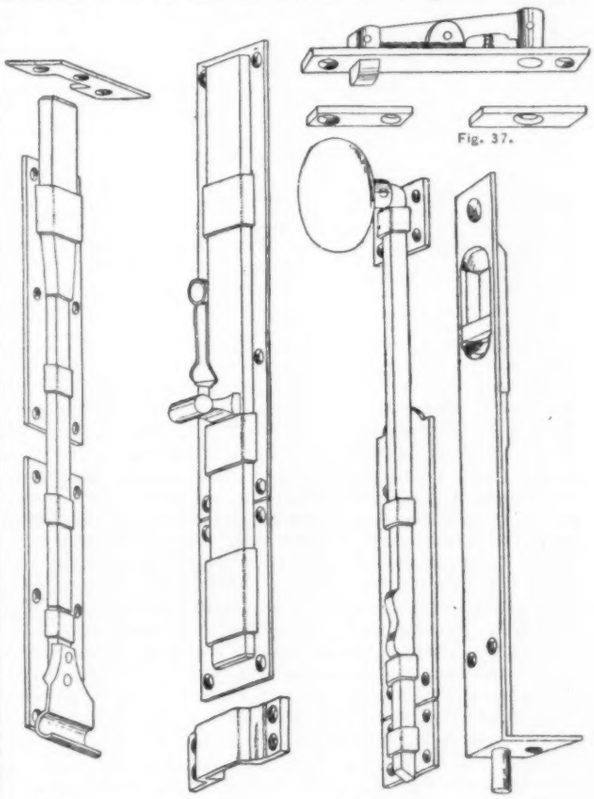


Fig. 37.

Fig. 38. Fig. 39. Fig. 40. Fig. 41.

[1] Continued from No. 661, page 85.

spring throws the bolt down when the door is opened. The action of Figure 37 is somewhat different. The bolt is mortised into the soffit or the bottom of the door-frame, and the two plates are screwed to the tops of the doors. For a bolt as shown by the figure, the right-hand door is closed first, when the other door is closed it strikes the bevelled connection of the bolt, forcing it up and consequently forcing the other arm of the bolt down into the plate on top of the right-hand door. The doors can then be locked together with a key or catch, though the friction on the striker will keep them closed. A spring forces the bolt up when the left door is opened. This form of bolt can be used for cupboards, wardrobes, etc., but we do not know of its having ever been applied successfully to large double-doors.

Flat-tail-bolts, Figure 38, are intended for high doors requiring to be bolted at the top, and are made in a number of different lengths, from one to seven feet. When the bolt is shot it is kept from slipping down by a rebate in the shank which catches on the lowest staple, as seen by the figure. Figure 39 is a form of bolt used for shutters having a wide bearing on each side. It is provided with a locking lever at the upper side, catching in a notch on the bolt. The same form is made without the locking-lever. Canada-bolts, Figure 40, consist of a long, square shank or bolt, with mineral or porcelain knob. The bolt is kept from slipping by a short, flat spring underneath. These are sold with several varieties of staples.

The following table gives the average retail prices of the bolts previously enumerated. Only the principal sizes are listed, but these will be sufficient to give an idea of the cost.

TABLE OF PLAIN BOLTS.

Prices per dozen.

Fig.	Length in inches.	2	2½	3	4	5	6	8	12	36	84
		$	$	$	$	$	$	$	$	$	$
24	Wrought-iron barrel-bolt common staples	....	....	1.10	....	....	....	3.25	.....	....	.....
25	Wrought-iron barrel-bolt bent staples	....	....	2.25	....	....	....	4.00	.....	....	.....
26	Wrought-iron barrel-bolt necked staples	....	....	1.15	....	....	....	3.40	.....	....	.....
27	Wrought-iron round, neck bolts	....	....	....	3.10	3.30	3.50	....	.....	....	.....
28	Wrought-iron square, neck bolts	....	....	....	2.45	....	3.65	4.70	.....	....	.....
29	Brass mosquito-bar bolts	1.05	....	....	....	....	....	....	.....	....	.....
30	Wrought-iron, square, spring bolts	....	....	1.20	1.50	1.60	1.70	2.40	.....	....	.....
31	Wrought-iron side spring bolts	....	....	....	....	....	....	5.95	.....	....	.....
32	Brass straight cupboard-bolts	1.50	....	2.15	....	....	....	....	.....	....	.....
33	Brass flat cupboard-bolts	....	.88	....	....	....	....	....	.....	....	.....
34	Brass ship flush-bolts	2.40	....	....	....	....	....	....	.....	....	....
35	Brass side flush-bolts	....	2.10	....	....	....	....	....	.....	....	.....
36	Brass bookcase-bolts, one size	2.10	....	....	....	....	....	....	.....	....	.....
37	Brass bookcase catch one size	2.10	....	....	....	....	....	....	.....	....	.....
38	Wrought-iron flat-tail bolts	....	....	....	....	....	....	....	10.20	....	26.25
—	Wrought-iron shutter-bolts plain	....	....	....	....	....	1.40	1.83	2.68	....	.....
39	Wrought-iron shutter-bolts with lock	....	....	....	....	....	1.49	1.92	2.77	....	.....
40	Wrought-iron Canada bolts	....	....	....	....	....	2.80	....	.....	4.32	.....

For front and vestibule doors in two folds as well as for other double doors some form of mortise-bolt is required. These may be mortised into the edge or sunk flush with the face of the standing door. Figure 41 shows the ordinary sunk flush-bolt. This pattern is made with plates three-fourths inch wide and bolts from six to twenty-four inches long. The retail prices average from $5.60 to $9.52 per dozen in bronzed wrought-iron. Bolts of similar description but with a square rod, Figure 42, are made with plates one and one-fourth inches wide and fifteen to sixty inches long, costing $9.80 to $23.60 per dozen in bronzed iron, with bronze knob. The same styles of bolts are also made in cast brass; a few dealers keep them in stock nickel-plated. The pattern represented by Figure 42, is, of course, used only on the face of a door.

A mortise flush-bolt is one which is mortised into the thickness of the door and is operated by a knob or handle working in a face-plate, Figure 43, illustrates one variety. The bolts are made from nine to forty-eight inches long, and the retail prices are from $1.50 to $1.80 each, in bronze.

Figure 44, illustrates a form of self-locking flush-bolt. A lever on the bottom of the bolt catches over a shoulder on the face-plate when the bolt is shot. To release the lever it is simply pushed inward, a coiled spring at the top otherwise holding it in position. Figure 45, shows another device in which the bolt is thrown by turning the knob. A peg at the back of the

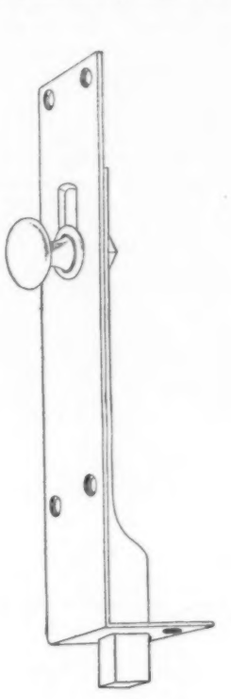


Fig. 42.

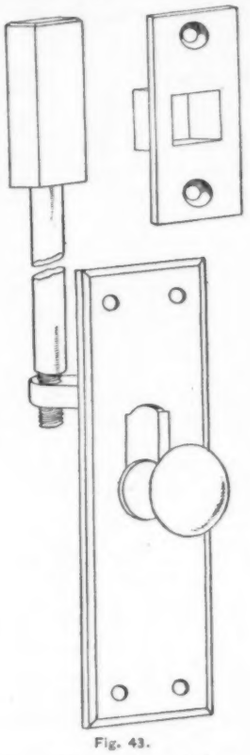


Fig. 43.

knob works in a horizontal slot in a tail-piece attached to the bolt. Raising the bolt brings the peg in the line of the centre of rotation of the knob and so locks it.

There are several varieties of latch spring flush-bolts, in

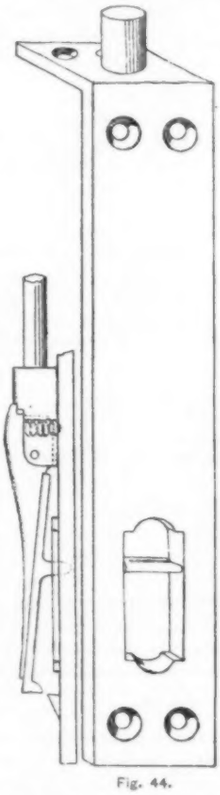


Fig. 44.

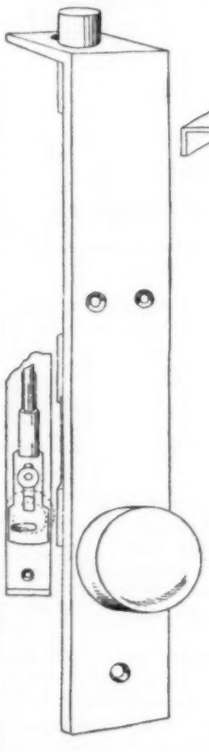


Fig. 45.

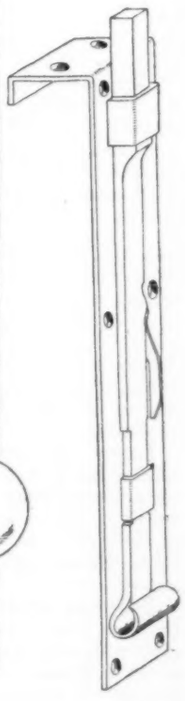


Fig. 31.

which the knob remains thrown out but can be drawn down by a pull within convenient reach of the hand. Figure 46 illustrates one such arrangement. P. & F. Corbin also manufacture

a latch-spring bolt which is mortised into the edge of the door, and in which the latch bolt is released by pressing on the face-plate.

For store doors it is customary to use bolts applied to the face of the door instead of being mortised-in flush. In this case the upper bolt is attached to a chain which hangs about six feet from the floor. The lower bolt is held up by a spring, but can be pressed down into place with the foot, a spring catch on the face holding the bolt when down.

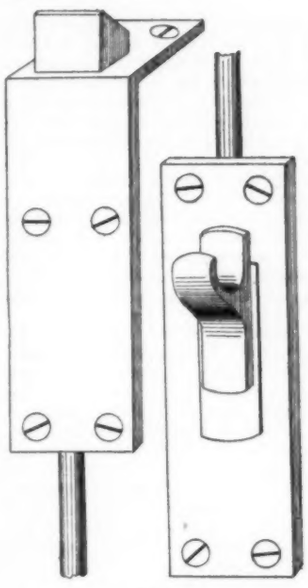


Fig. 46.

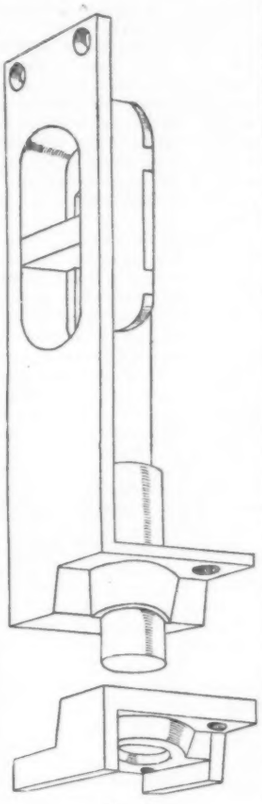


Fig. 48.

Figures 44 to 46 inclusive, are types of a great variety of styles manufactured in several different metals with all kinds of finish and design. It is, therefore, impracticable to give for these any average prices which could serve as fair criterions.

The Hopkins & Dickinson Manufacturing Co., have recently put on the market a form of flush-bolt intended specially for Dutch doors, that is to say, doors in two folds, horizontally. Figure 47 illustrates this. The bolt-plate is about seven inches long, and is rebated to match the rebates of the doors. The retail price of a single bronze bolt is $2.50.

Engine-house bolts are made in a variety of forms generally so as to permit of being opened easily, by a large catch or latch which throws the bolts up and down from bottom and top. These cost from $6 to $9 each, though it is impossible to give any fair general price as the bolts are made only to order.

[To be continued.]

AN ARCHÆOLOGIST'S ACUTENESS. — As already announced, a remarkable archæological discovery has just been made in German Altenburg, a small town between Vienna and Presburg, on the Danube. From further details now published it appears that Professor Hauser under whose direction the Carnuntum excavations are carried on, ever on the alert, had for a month past observed the color of an extensive corn-field, which varied in every part. He found an elevated post of observation, and, after a week's close attention, declared it to be his opinion that the corn-field was growing over the site of an ancient amphitheatre. His drawings showed that the oblong centre piece was somewhat concave, and the corn was quite ripe in that part, because there was so much soil between the surface and the bottom of the theatre. Elliptical lines of green, growing paler the higher they rose, showed the seats, and lines forming a radius from the centre showed the walls supporting the elliptical rows of seats. The Professor waited impatiently for the corn to ripen, and the moment it was cut the excavations began. They have shown that the almost incredible suggestion was perfectly correct. Six inches below the soil the top of the outer wall was found, and from there the soil gradually grew thicker until the bottom of the arena was reached, the pavement of which is in perfect condition. From the theatre a paved road leads to the Camp of Carnuntum. As soon as the theatre has been entirely freed of soil covering it, all the measurements will be taken, and it will be ascertained what arena it is. — *London Times.*

ITALIAN CITIES.[1] — IV.

MILAN. — II.

Monument at Milan to those who fell at Mentana. Belli, Sculptor.

IF there are anywhere in the world any religious structures which are larger than Milan Cathedral, it is nevertheless the largest among those built of marble. The first stone was laid in 1386 by Jean Galeas Visconti, who, having poisoned his uncle Barnabas, believed, according to the opinion of the times, that by this work of piety he would gain divine forgiveness. Many religious foundations of these days had no other origin. The name of the architect who made the design is not definitely known. Commonly a German artist, Heinrich Arles of Gmünd, is credited with it; but this story is usually contradicted by the Italians. There was at that time at Coma, near Milan, a school of masons and architects who played an important rôle in the architectural history of Italy, and who were employed on all important constructions from one end of the peninsula to the other. On the register of those concerned in the construction of the cathedral are the names of many of the members of this school, which allows us to suppose that the building is the fruit of a collective collaboration. Many foreign artists of great renown were also called from time to time to give advice and counsel, and among them figured with some prominence Nicolas Bonaventure and Mignot, Frenchmen, toward the end of the 14th century, and some architects of Freiburg. But the Italian artists always carried on a smothered warfare against these foreigners, and forced them to withdraw. In 1486, the Duke Sforza, the successor of the Visconti, demanded that the magistrates of Strasbourg should send him the architects of their cathedral, that they might solve certain difficulties of construction which retarded the completion of this building. This variety of collaboration had naturally enough as a consequence the debasing of the style of the monument and destruction of the unity of the design, without which there can be no perfect work of architecture. Each one wished to correct and modify and undo that which his predecessor had done, and this interrupted succession of workers has completely destroyed the purity of the original conception. It was, nevertheless, an Italian artist who gave the finishing touch to the monument, born under an evil star. In 1560 Cardinal Borromeo intrusted the direction of the works to Pellegrino Tibaldi, an artist of the post-Michael-Angelesque school. This artist was educated in the principles of the Decadence, and finished by giving to the monument that *baroque* air which prevents it from figuring amongst the monuments of the best school. Tibaldi held the Gothic style in horror as a foreign importation, and earnestly set himself about disfiguring the edifice and destroying so far as possible, every trace of its origin. He could not destroy the general ordonance of the design, but he introduced changes enough to make the incongruity visible. It was he, for instance, who opened the five doorways in the façade, instead of leaving them three as consecrated by long usage, and who decorated the windows in so inharmonious a manner. Thanks to his efforts the cathedral in some ways looks more like a building of the Renaissance than a monument of Gothic times.

Napoleon I, when he arrived in Italy, also wished to take a hand in the matter, since the façade was not yet finished. In eight years it was entirely finished, but we recognize to-day that it disfigures the monument instead of completing it. The Italian Government has

[1] Continued from No. 661, page 92.

lately held a competition, since people wished that this Gothic building should have a Gothic façade, and it is to be hoped that the selected architects will know how to repair the injuries which their ancestors did to this fine monument.

The interior of the cathedral is in greater harmony. Here the original design has been better respected. The five naves covered by Gothic vaults are separated by 52 octagonal columns 25 metres and 39 centimetres high. The capitals, elongated drums in form, are conceived in a bizarre taste, but they are not wanting in majesty; and the windows which form the end of the apse allow entrance to the interior of rays of light, mitigated and softened, which do no harm to the religious character of the place. On the left on entering are the baptismal fonts. They say that the porphyry basin which contains the holy water formerly belonged to the baths of Maximian Hercules. According to the Ambrosian rite, which is followed in the diocese of Milan, baptism is made here by immersion, as was practised everywhere before the decisions of the Council, which arranged things differently. The Ambrosian rite, which dates from Barnabas, a disciple of St. Paul, was definitely regulated by St. Ambrose, who governed Milan at the time of Theodosius the Great. The essential difference between it and the Roman rite consists mainly in baptism by immersion, in the details of the liturgy, and in the manner in which are celebrated the holy mysteries, besides the prolongation of the carnival up to the first Sunday of Lent.

On the right in the transept can be observed the tomb of Giacomo de' Medici, the design of which is attributed to Michael Angelo. Not far from there the visitor's eye is caught by the statue of the half-flayed St. Bartholomew. It is an anatomical study rendered with such brutality of chisel that it would be more in place at the entrance of a clinical lecture-room or in the court-yard of the shambles than under the vaults of a church. The author had the ingenuousness to engrave on the pedestal the following inscription: "*Non me Praxiteles sed Marcus finxit Agrates.*" The statement seems rather superfluous, for it would never have occurred to anybody to attribute this statue of the amphitheatre to a celebrated Greek sculptor. A short distance from the sacristy are the stairways which lead to the tomb, where sleeps clothed in his pontifical robes, St. Charles Borromeo. Marvels of the goldsmith's art and the chisel of the sculptor have been combined to embellish this mausoleum; but aside from the richness of the decoration, it lacks every artistic value. The chapel alone has cost not less than 4,000,000 lira. The wood-carvings of the choir, as well as the designs of the windows in the apse, are the works of foreign artists, brought here at the end of the fourteenth century, and notably of Nicolas Bonaventure, Jean Mignot, and Jean Campanios, a Norman. This is the portion of the church where is to be found the simple and archaic character of the early times.

As I have already observed, the Cathedral of Milan cannot be rigorously considered a monument which indisputably belongs to the Gothic style, but it is none the less beautiful for that. After all, the purity of style which we ordinarily exact when we encounter works of architecture is the result of prejudice and pedantry, rather than of an exact conception of good taste. What we demand in an edifice is that it should please the eye, should realize an æsthetic conception of it, should incarnate in some form or other the beautiful and, especially, should faithfully respond to its intended use. A theatre should inspire mirth, awaken ideas of worldly recreation, and carry the mind of the spectator to a contemplation of fiction and poetry. A temple ought to awaken the sentiment of prayer and symbolize according to the spirit of the religion to which it belongs the aspiration of man toward God. In China, where religion is a very vague and very undecided manifestation of faith, and where the idea of God is found mingled with superstitious beliefs and philosophical traditions, religious architecture lacks every indication of a pious character. The pagoda, with its uniform type, is a public edifice whose beauty and richness can vary according to the locality, but which is not capable in its structure of revealing any religious idea whatever.

At Rome and in Greece, where paganism was only the humanization of faith cut up into many incarnations of which each was the manifestation of one of the forces of Nature, religious architecture had as many types as there were divinities on Olympus; and that explains to us why the religious buildings were so numerous and so varied. The Christian religion is the only one which has endeavored to put man *en rapport* with God through prayer. Elsewhere it is sometimes terror, sometimes bestial superstition, sometimes blind submission, which forms the base of the dogma. Here it is the necessity of constantly communicating with the Supreme Being of imbibing at the divine source every rule of life's conduct, and of remaining constantly in communication with the forces of truth which determines the exterior character of our religion. Thus, then, the church must especially express this need of approach, — this instinct of aspiring towards Heaven; and every race has expressed this architectural tendency according to its temperament. The people of the North, deprived of sun and flowers and of that splendor of nature which embellishes the South, have given to their temples a calm, severe and meditative physiognomy, from which the Gothic architecture has had its birth. The people of the South, more easily moved, more impulsive, habituated to satisfy their eyes with smiling and luminous landscapes, desired churches in which should be reflected the joyousness and radiance of the southern nature.

The exaggeration of these two tendencies has produced, as say the pedants who always assert purity of type in those monuments to which they accord their admiration, a manifest exaggeration in the artistic creations which have resulted from them. The Gothic is poor and mournful. It suggests to the mind funereal and despairing thoughts, and gives to religion a signification which it ought not to have, since it is composed, before all, of love and hope. The style of the Italian Renaissance on the other hand, which is the only one which can be contrasted with the Gothic, removes from Gothic architecture every severe and restful note. It accumulates too thoughtlessly all kinds of ornamental motives, and with a purely worldly intention of rejoicing the eyes and from a distance the imagination, it gives to the religious edifice a mundane aspect which does not answer precisely to its intention. One seems to be more conscious of the presence of God under the vaults of the Cathedral of Strasbourg than before the tombs of the apostles in St. Peter's at Rome.

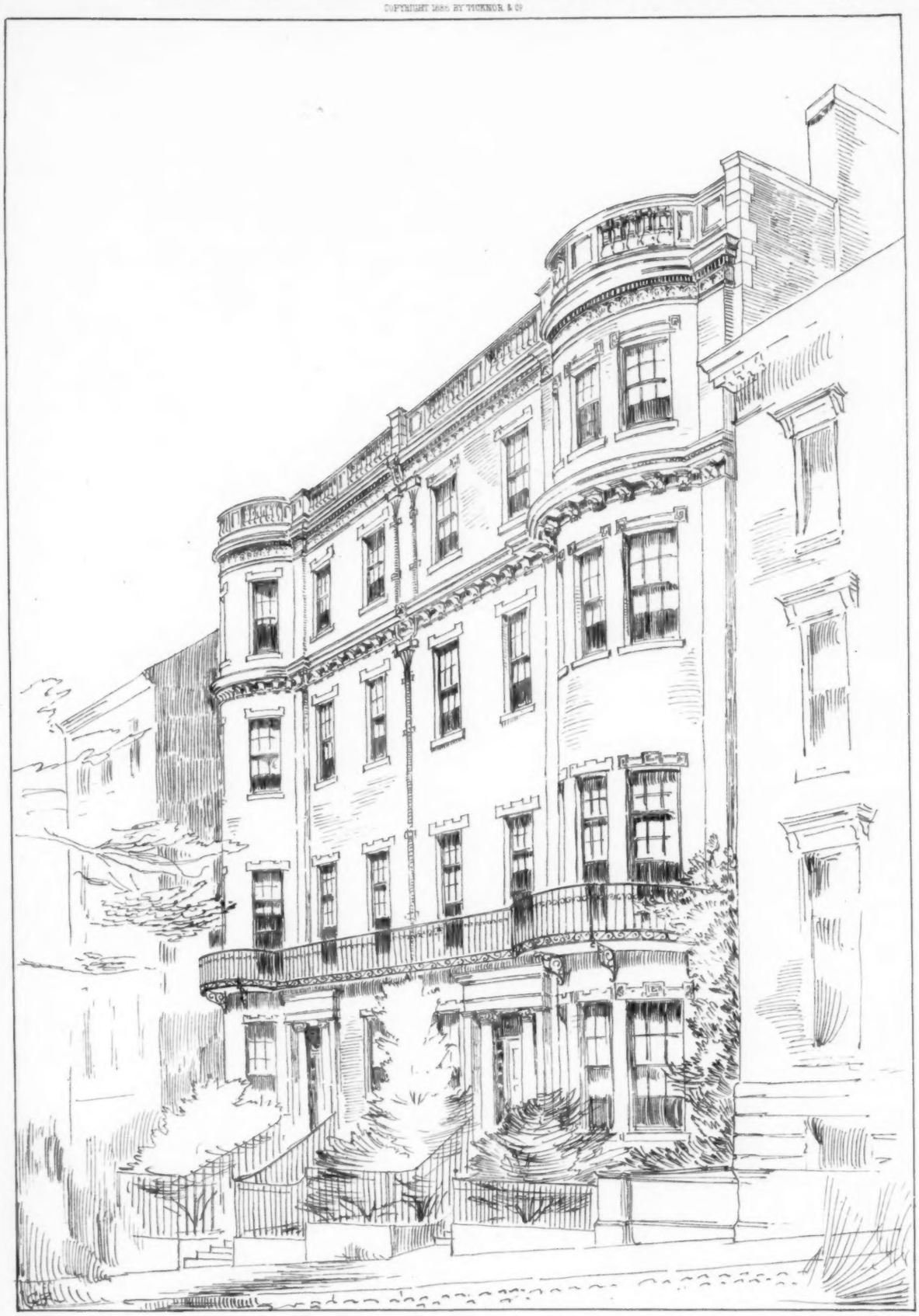
In reality, when one judges a monument, he ought to listen attentively to the sensations which it awakens; to ask himself if these sensations are still in accord with the object to which this monument is dedicated; and when the pleasure which one experiences in beholding it is found to be not in contradiction to the sentiment which has compelled us to examine it, it may be admired without reservation and especially without asking one's self if the building can be accredited to any particular style.

I have attempted to state briefly these views, apropos of the Cathedral at Milan precisely because, as a usual thing, this building is accused of being not exactly Gothic nor quite Italian. It shall be whatever one wishes it to be. I will assert even, that it is one as well as the other; but that which it unquestionably is, it is, amongst the edifices of Southern Europe, perhaps the only one which translates with the greatest eloquence the irresistible movement which draws man towards God.

After the cathedral, the most interesting church which can be seen at Milan is that of St. Ambrogio. The personage who bears this name is one of the most important figures in the history of the Milanese. St. Ambrogio was born a Gaul, at Treves, about 340. He followed the calling of barrister; but when Probus, the pretorian prefect, destined him to the government of Liguria and Emilia, to which at that time the City of Milan was attached, in the course of a civil outbreak he showed himself animated by a lively interest in the well-being of the people, so that he was elected bishop by acclamation. He desired to decline because he was not yet a Christian, and up to that time had practised the religion of the Druids; but he was baptised and consecrated priest, and could then discharge those episcopal functions with which he had been invested. The democratic sentiments which had captivated the popular favor did not desert him after his elevation. He opposed an heroic resistance to the outrageous pretentions of the Empress Justine, who favored Aryan heresy. To satisfy the needs of the poor he caused to be sold the sacred vases, and refused to admit to the church the Emperor Theodosius, until he had done penance for the massacre with which he had soiled himself at Thessalonica in 394. He died three years after. He was in some sort the torch of the church, which, since the death of Lactantius had remained without light. The Milanese held him in great veneration, so much so that they are still styled Ambrosians. The church which to-day bears his name, and of which the first stone was laid in his episcopacy in 387, rears itself over the site of an ancient temple dedicated to Bacchus. It could be likened to a museum, because of the variety of inscriptions, busts, monuments, bas-reliefs, and other relics and historical curiosities which it contains. Since its foundation it has been rebuilt, remodeled, and altered, and finally the same Tibaldi, who did so much to alter the character of the cathedral, was also called in to complete the architecture of this church. Such as we see it to-day, it offers the perfect image of a vaulted Lombardic basilica, which hardly dates back farther than the twelfth century, for the bay of the nave, under which is placed the bishop's pulpit, fell for the last time in 1196. It is in this basilica that St. Ambrose repulsed the Emperor Theodosius, and it is here also that St. Augustine abjured his errors. The church is preceded by a vestibule of the ninth century, surrounded by a vaulted portico without ribs, the walls of which still bear traces of the inscriptions of the twelfth century and paintings of the same date. The temple is entered through three doorways, the middle one of which, of cypress wood, is magnificently carved, and is, according to many archæologists, a work of the eighth century. The interior is composed of three naves of Romanesque architecture. Over the meeting of the transepts with the apse rises a dome. The columns which support the naves are covered with stucco in imitation of marble. The dome is octagonal, with pendentives.

Under the grand nave may be noticed a porphyry column, bearing on its summit a bronze serpent, which came from Constantinople, and which, according to popular traditions, is nothing less than the famous brazen serpent which Moses showed to the people of Israel, and which must hiss at the end of the world. But the greatest artistic curiosity which this church contains is the golden *paliotto*, or retable of the altar, sculptured and enriched with precious stones, the work of Volvinio. It is the oldest piece of goldsmith's work known in Italy; and this monument proves that this admirable art, which Benvenuto Cellini was to carry in the sixteenth century to its highest degree of perfection, was then broadly known in Italy and had

COPYRIGHT 1888 BY TICKNOR & CO

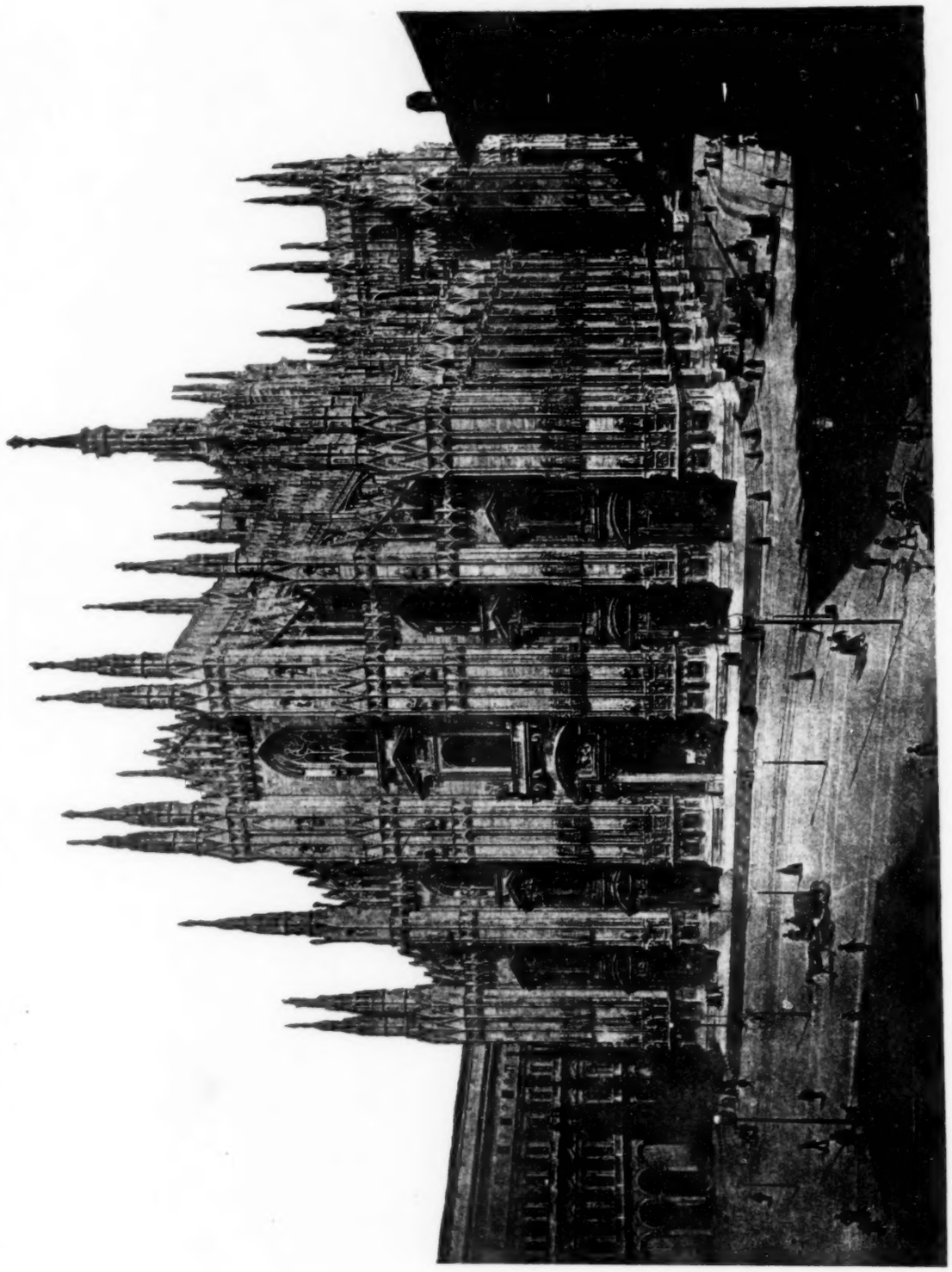


Heliotype Printing Co. Boston.

Alteration of Houses
For Mr A. T. Lyman and Mr M. B. Inches
39+40 Beacon St.

Hartwell and Richardson Archts 68 Devonshire St Boston, Mass.

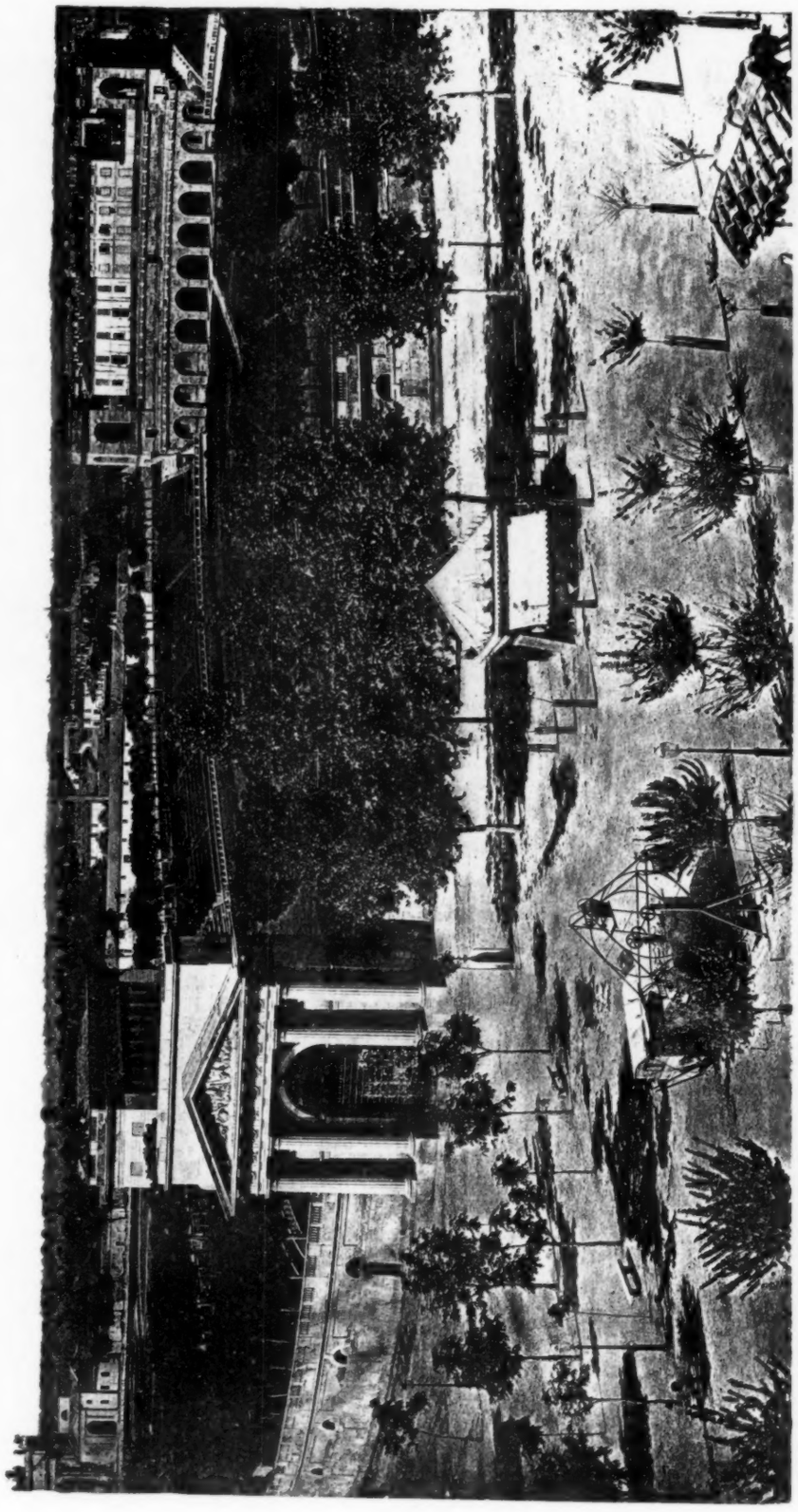
COPYRIGHT 1888 BY TICKNOR & CO.



The Cathedral, Milan.

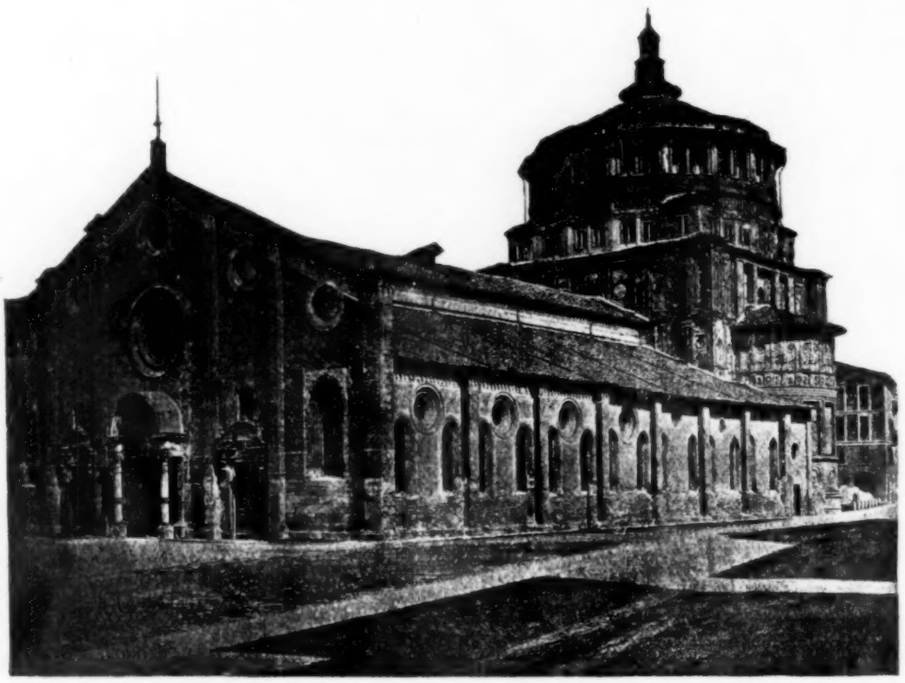
Heliotype Printing Co. Boston.

COPYRIGHT 1888, BY TICKNOR & CO.

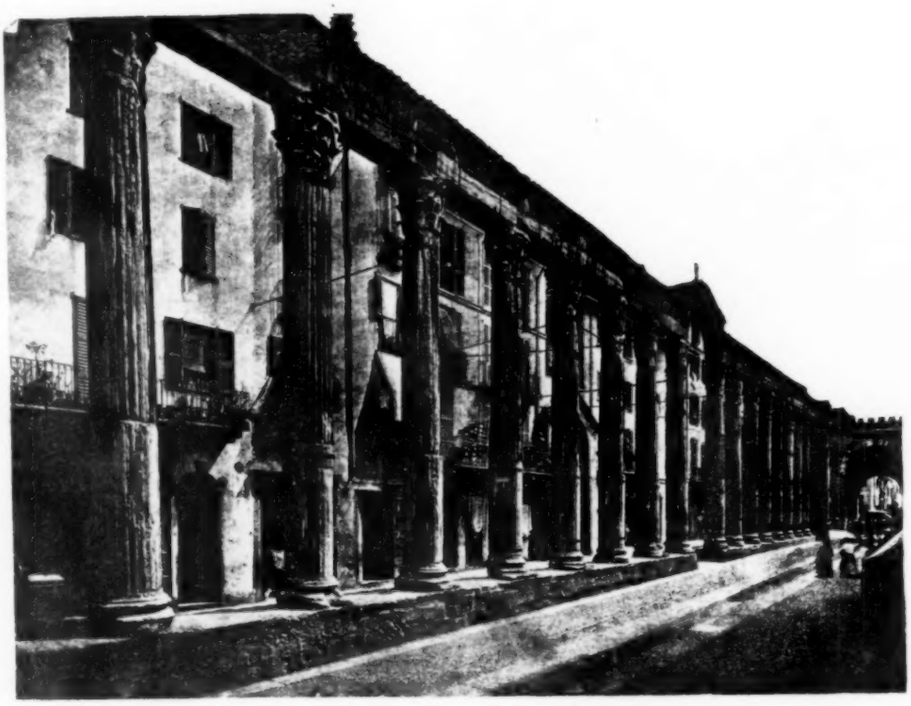


The Arena, Milan.

COPYRIGHT 1888 BY TICKNOR & Co



Church of S Maria delle Grazie
~Milan~



The Roman Colonade at S Lorenzo
~Milan~

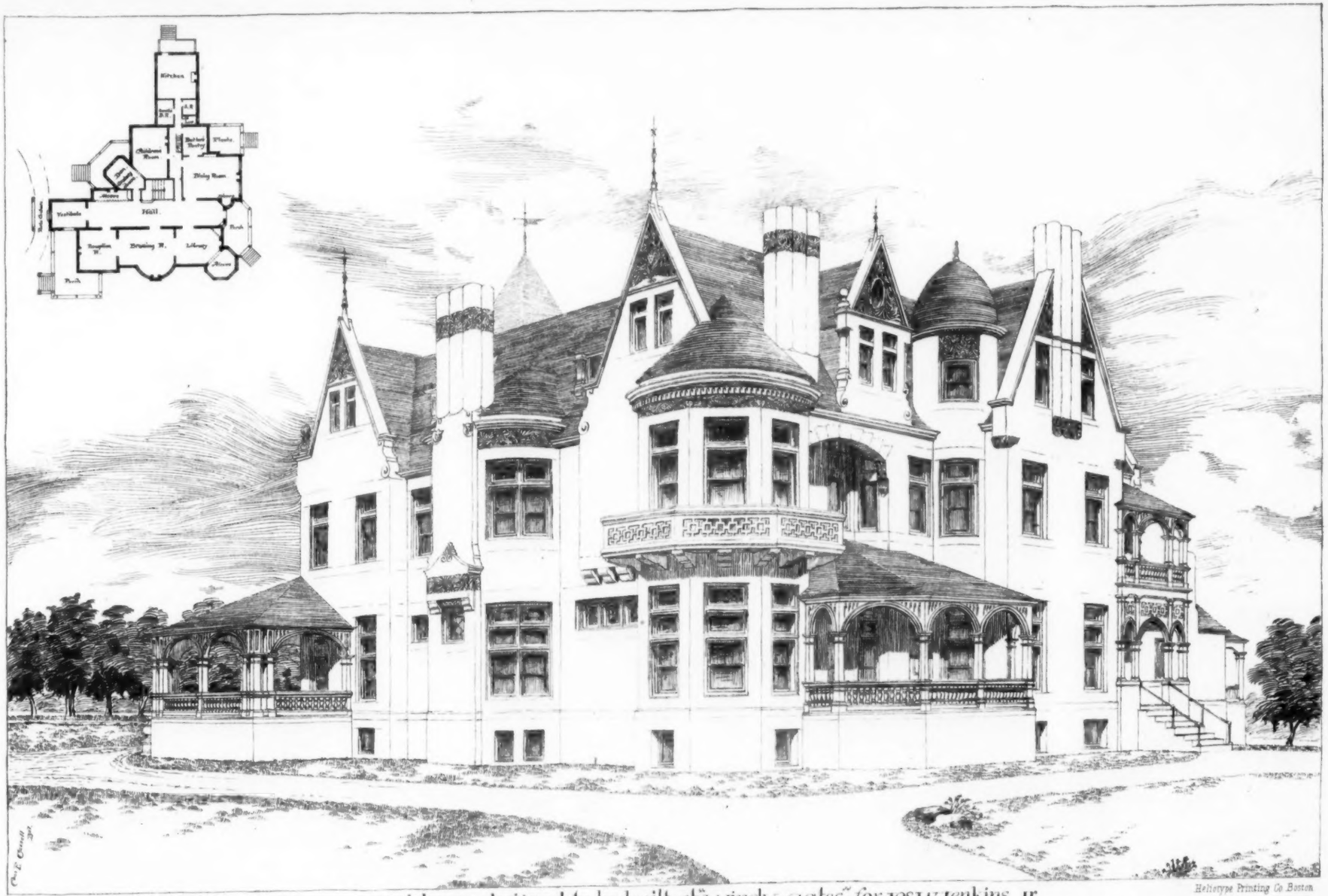
Heliotype Printing Co Boston

COPYRIGHT, 1888, BY TICKNOR & CO.

House for W. H. Wray.

E. W. Dietrich, Architect
18 Broadway, New York, N.Y.

Heliotype Printing Co. Boston.



Residence designed to be built at "Windy Gates" for Jos. W. Jenkins Jr.

N.W. View.

COPYRIGHT 1885 BY THE AMERICAN A. & B. N. CO.

already made considerable progress at a time when the other plastic arts and the arts of drawing were still in their infancy.

The Church of St. Eustorgio is also one of the oldest. It was erected by the archbishop of this name on the occasion when he transported from Constantinople the three bodies which are considered to be those of the three Magi. The façade which we now see is modern, but the apse is older than the tenth century.

From the point of view of the history of modern art Santa Maria delle Grazie deserves special mention. The dome and the sacristy passed as being designed by Bramante, the compatriot, the friend, the protector of Raphael. We indeed recognize in this ingenious architecture, so gracious, so precious, so pretty, the style of that architect who was just then the master of the destinies of the Church of St. Peter at Rome, and who had all the qualities of an artist of the first order, except grandeur of conception. The great doorway which opens in the midst of the façade, is surely a chef-d'œuvre of the Renaissance, and must even be considered one of the purest, finest, most irreproachable fragments which this epoch, so much discussed, so capable of being much discussed, has left to us.

It is in the old refectory of the convent that we go to look up the "Last Supper," by Leonardo da Vinci, that grand artist who had the enviable happiness of surpassing all his contemporaries and surviving almost all of his works, — of which he left us almost nothing. There were only a few Greek or Roman artists who enjoyed this kind of glory. The history of this mural painting is singular: Leonardo worked over it six years; sometimes he spent several consecutive days at his task; sometimes he remained whole weeks without adding a brush stroke. He mingled at night with the frequenters of taverns in order to discover a type for the face of Judas. It is not known whether the "Last Supper" was painted in oil or in fresco. Certain is it that the master prepared the surface after a process of his own, and it proved that his plastering was defective. Half a century later the painting was already dropping off in scales; and today we know the "Last Supper" only by the copies which were made before it was wholly destroyed. The neglect of the monks greatly hastened its ruin. In 1652 they cut off the legs of the Savior and his apostles for the sake of enlarging the door of the refectory. In 1726 they gave the *coup de grace* by intrusting the restoration to a certain Bellotti, who daubed it over to such a degree as to make it unrecognizable. He had the assurance to entirely repaint it, so that what we see today, in the place where was the chef-d'œuvre of Leonardo, is only the imitation of the restorers. In 1796 a French general turned the refectory into a stable and then into a hayloft. Finally, they attempted, but without result, a new restoration. The best copies are those of Marco D'Oggione, pupil of Leonardo, and the engraving by Morghen.

Milan possesses also a church in which we recognize the perfect type of the style of the Decadence. It is called Santa Maria presso San Celso, and it is attributed to Bramante, but I share the contrary opinion with Mongeri, who believes that it was designed by Dolcebono, one of Bramante's pupils. In truth, the general disposition of the motives, the excessive exuberance of ornament, the odd mixture of obelisks, torch-holders, statues, and particularly the device adopted of giving emphasis to the horizontal lines, perfectly characterize Dolcebono's manner. We can say that this church presents one of the most perfect models of architectural aberration which Italy fell into after the death of Bramante and Michael Angelo, for all the oddities of *baroque* taste are found united here, as can be judged from the design which we will lay before our readers.

Five kilometres from Milan lies the Chartreuse of Chiaravalle, so named because it was founded by the French monks from Clairvaux. The history of this foundation is quite curious. In 1134 the Abbot Bernard, whose reputation for great sanctity had already preceded him, arrived at Milan, having been called upon to put an end to a conflict which had arisen between the Milanese and Pope Innocent II. He was received and lodged with great honor in the Monastery of St. Lorenzo; and as the nobility of the city were exceedingly satisfied with the manner in which he discharged his delicate mission they besought him to found near the city an establishment regulated by the same laws which had already rendered the Abbey of Clairvaux prosperous and celebrated. St. Bernard yielded to their desires, and in a short ten years the colony of Chiaravalle had become the centre of the agricultural prosperity of all Lombardy. The abbey is very remarkable because of the purity of its Gothic style and for the grace and justness of its proportions. It contains within very remarkable paintings of the Lombard school, of which, we know, Leonardo da Vinci was the founder. Its clock-tower is a chef-d'œuvre of elegance and boldness, and rises with much vigor above the imposing mass of the church without crushing it and without diminishing its majesty — a thing which is always a very difficult problem for an architect to solve. It is octagonal in form to the height of the upper roof, which sustains the spire, and is composed of several rows of doors and windows arranged with a rich simplicity. The readers of the *American Architect* will remark that this tower is very similar to the type generally adopted by a great number of American architects.

It would not be possible to leave this review of the chief churches of Milan without mentioning San Lorenzo, which, according to tradition was a building erected by St. Ambrogio over the ruins of the Baths of Hercules. The plan of the building and the structure of its dependencies give much support to this tradition. The capitals, the sarcophagi and certain chapels all belong to the Roman epoch. The building, moreover, is a combination of several kinds of architecture. It is Roman in its columns, Byzantine in its dome, and Lombard in the square towers which rise upon its flanks; but its principal feature consists in the Roman colonade which borders the Corso di Porta Ticinese before a courtyard which lies before the church. These Corinthian columns still preserve, although damaged by a fire in 1071, that grandiose aspect which distinguishes from ordinary things the relics of the Roman period. They are more important here because Milan, in spite of the leading role which she formerly played in Roman administration, has only preserved very few remains of the period. We are told that these columns belonged formerly to the baths of Maximian. The name of the city also is found associated with the history of the most important act of the reign of Emperor Justinian, for it was at Milan that was published in the year 313, in the Church of St. Thecla the imperial edict which granted full liberty to practise all forms of religion.

[To be continued.]

THE ILLUSTRATIONS

[*Contributors are requested to send with their drawings full and adequate descriptions of the buildings, including a statement of cost.*]

BUILDING OF THE HASTY-PUDDING CLUB, CAMBRIDGE, MASS. MESSRS. PEABODY & STEARNS, ARCHITECTS, BOSTON, MASS.

[Gelatine print, issued only with the Imperial Edition.]

ALTERATIONS TO HOUSE OF MESSRS. A. T. LYMAN AND M. B. INCHES, BOSTON, MASS. MESSRS. HARTWELL & RICHARDSON, ARCHITECTS, BOSTON, MASS.

THE houses Nos. 39 and 40 Beacon street as originally built were three stories in height with pitched roof, and cornice carved in solid wood. The porches and door and window trimmings were of white marble, the body of the walls of brick. Another story of rooms has been added, the cornice, which was very much decayed, removed and replaced in marble, which material was also used in the decoration of the additional story. At the same time, house No. 39 was thoroughly remodelled internally, a wing in the rear rebuilt, and in place of the picture-gallery which it originally contained, a ball-room has been made. This is richly decorated with woodwork delicately carved and with silk hangings upon the walls.

VIEWS IN MILAN, ITALY. — THE CATHEDRAL: THE ARENA: S. MARIA DELLE GRAZIE: THE ROMAN COLONNADE.

SEE article on Milan elsewhere in this issue.

HOUSE OF J. W. JENKINS, JR., AT "WINDY GATES." MR. C. E. CASSELL, ARCHITECT, BALTIMORE, MD.

HOUSE OF W. H. WRAY, ESQ. MR. E. G. W. DIETRICH, ARCHITECT, NEW YORK, N. Y.

ANCIENT AND MODERN LIGHT-HOUSES.[1] — XXIII.

LIGHT-HOUSE ADMINISTRATION.

TO select the proper sites for light-houses, to plan and erect them on difficult sites, to devise suitable optical apparatus, illuminants and lamps, to appoint proper keepers, to furnish the supplies, and to attend to all the minutiæ consequent upon a service

[1] Continued from page 65, No. 659.

whose stations are scattered along a coast and are frequently difficult and dangerous of access, requires a combination of qualities seldom found in one individual. Therefore, in the more important maritime nations the control of the light-house system is vested in Boards whose members are as a rule selected with a view to their ability in the various lines indicated above, and whose orders are carried into effect by district officers.

FRANCE.

The Light-House Board of France, known as the *Commission des Phares*, has its office in Paris, on the hill Trocadéro, overlooking the Seine and Champ de Mars. This board consists of four engineers, two naval officers, one Member of the Institute, one inspector-general of marine engineers, and one hydrographic engineer.

The executive officers are the Inspector General of the Corps of Engineers *des Ponts et Chaussées*, who is Director of the French light-house administration, and another engineer of the same Corps, who is Engineer-in-Chief and Secretary to the Commission.

The entire administration on the seaboard is entrusted to the engineers who in addition are charged with the work of river and harbor improvements.

The buildings of the Commission are placed around a rectangular court-yard in which are models of light-houses, buoys and other apparatus pertaining to the establishment. The principal building, containing the offices is a handsome structure two-stories high, built of brick and limestone in alternate courses. It is surmounted by a tower and first-order lantern, for experimental purposes.

The grand entrance-hall also contains many models, the most striking being those of the rock light-houses of France.

The council-chamber is richly decorated and upon its walls are painted two large charts, each occupying an entire side: one shows all the light-houses of the world, the other the light-houses of France, showing the illuminated areas. A bust of Fresnel, the inventer of the dioptric system occupies a prominent position, not only here but at all French light-stations where it is placed over the entrance-

Longstone Light-house, Farne Islands.

door. The museum is well-stocked with every kind of illuminating apparatus, both dioptric and cata-dioptric, though the latter is no longer used in French light-houses. It includes many objects of historical interest, among them the first lens apparatus made from Fresnel's designs, and placed in the Tour de Cordouan, and also the various apparatus showing the successive steps by which he arrived at the lens now used in all parts of the world.

At this depot the lenses and lamps undergo a thorough trial, the oil, however, is sent directly to the various districts and is there tested by the district engineer.

The light-keepers are known as "masters" and "keepers," and are appointed by the prefect or chief civil officer of the department on the nomination of the district engineer; men who have served in the army or navy are given the preference. The following requisites are necessary: They must be Frenchmen, between twenty-one and forty years of age, free from all infirmities which would prevent an active daily life, they must present a certificate of good moral character, know how to read and write, and have an elementary knowledge of arithmetic.

In return for their services the following annual salaries are paid: master $200, principal or keepers of the first class $170, second class $155, third class $140, fourth class $125, fifth class $110, sixth class $95. There is also allowed to each master and keeper a certain amount of fuel, and those at isolated stations receive rations. These salaries are paid in monthly instalments subject to a deduction of five per cent, which is used for a fund for retiring pensions.

There are never less than three keepers at a first-order light, and two at lights of the second and third orders. Masters are charged with the supervision of the service of several lights, the title (*maître de phare*) can also be granted to those of the principal keepers (*chefs gardiens*) who have merited it by exceptional service. The masters and principal keepers have general charge and attend to the correspondence, the other keepers owe obedience to them, but have the right of appeal to the engineer.

Every year on the recommendation of the Engineer-in-Chief, a bonus not exceeding a months salary may be allowed by the prefect to the most meritorious keepers, the number receiving such bonus not to exceed one-fifth of the total number of keepers in the department. Masters and keepers may be punished or dismissed by the prefect on the report of the Engineer-in-Chief.

Each keeper is allowed one kitchen and two bedrooms for himself

Bressay Light-house, Shetland Islands.

and family; the kitchen and one bedroom is supplied with furniture by the Government; there is no regulation prohibiting the acceptance of gratuities from visitors, on the contrary it is rather expected.

ENGLAND.

The Corporation of Trinity-House, or, according to the original charter, "The Master, Wardens, and Assistants of the Guild, Fraternity, or Brotherhood of the Most Glorious and Undivided Trinity, and of St. Clement, in the Parish of Deptford, Stroud, in the county of Kent," existed as early as the reign of Henry VII, (1485 to 1509), and was incorporated by royal charter during the reign of Henry VIII (1509 to 1547). In 1565 during the reign of Queen Elizabeth, the corporation was empowered by act of Parliament "to preserve ancient sea-marks, and to erect beacons, marks, and signs of the sea," but it was more than a century, *i. e.*, not until 1680, before the corporation constructed or owned any light-houses. After that date it from time to time purchased the lights which were owned by private individuals, or by the Crown, and erected new ones. In 1836, an act of Parliament vested in the Trinity-House the entire control of the light-houses of England and Wales, and gave it certain power over the Irish and Scotch lights.

Prior to the act of 1836 the charge was from one-sixth of a penny to one penny per ton on all ships at each time of passing a light-house, but by this act uniform light-dues of a half-penny per ton were established. The charge of one penny per ton at Bell Rock light-house is the only exception to this uniform rate. National ships, fishing-vessels and vessels in ballast are exempt from dues.

The English lights are placed under the corporation of the Trinity-House; the Scottish lights are under the management of the Commissioners of Northern Lights, and the Irish lights are under the care of the Corporation for Preserving and Improving the Port of Dublin, commonly called the Ballast Board.

The principal provisions of the act of 1853 affecting light-houses are as follows:

(1.) The light-dues of the United Kingdom are to form one *imperial*

Howth Baily Light-house.

fund, under control of the Board of Trade. (2.) From this fund all expenses of erecting and maintaining the lights of the United Kingdom are to be defrayed. (3.) The three Boards which manage the light-houses of England, Scotland and Ireland are to render account

of their expenditure to the Board of Trade. (4.) The Trinity-House, or English Board, is to exercise a certain control over the Boards in Scotland and Ireland, and is to judge of all their proposals to erect new lights, or to change existing ones; but in every case the sanction of the Board of Trade must precede the acts of each of the three Boards.

This subordination to the Board of Trade causes much trouble and embarrassment.

The Elder Brethren of the Trinity-House, twenty-nine in number, comprise sixteen active members, including two officers of the Navy, and thirteen honorary members, all of whom are elected by the body as vacancies occur.

The honorary members include H. R. H., the Prince of Wales, some of the ministers to the Crown, several members of the nobility and of Parliament.

The Duke of Edinburgh is the present Master, but the Deputy-Master, who is elected by the Elder Brethren from their active list, is the executive officer.

The Corporation of the Trinity-House also includes the Junior Brethren, who are elected by the Elder Brethren, and have no duties, simply forming a reserve from which the Elder Brethren add to their number when vacancies occur.

Out of the annual revenues $1,725 are paid to each of the active members; these members are organized into committees which meet twice a week except when absent on duty. The entire Board holds weekly sessions, at which the matters previously considered in committee are disposed of.

Trinity-House is an ancient structure on Tower Hill, opposite the old Tower of London, in the "City;" it has a handsome freestone front in Classic style. The main entrance is on the ground floor through a capacious hall, where are exhibited models of many of the most famous light-houses in England, and also of beacons and buoys. There are ample accommodations for the officers, for the Board and Committees, for the Engineers' Department, and for photometric experiments, and in addition there is a grand banqueting-hall and *salon*.

The principal depot of the Trinity-House is at Blackwall, on the lower Thames; here are repaired the numerous light-ships employed on the coast above and below the mouth of the Thames. There is also a completely appointed lamp-shop. The grounds are limited in

extent and some of the buildings are old and inconvenient. Here is also stored a supply of buoys of all kinds.

There are two experimental towers fitted with second-order lenses for testing lamps, oils, effects of fog, etc.

There are other depots at Yarmouth, Coquet Island and other places, but the one at Blackwall is the principal depot for manufacture, supply and repair.

The immediate agents through whom the authority of the Trinity-House is exercised are called Superintendents, and each has some special duties assigned him, either the sole care of the service in some specified part of the coast or the charge of some special branch, such as the supply and storehouses at Blackwall. The tenders are under their orders; they wear a uniform on all occasions when on duty.

Light-keepers are appointed by the Corporation. The requirements are that they should be between nineteen and twenty-eight years of age, be of good moral character, be physically sound, and be able to read, write and perform the simpler operations of arithmetic. As vacancies occur successful applicants are taken on probation, *i. e.*, are appointed *supernumerary* light-keepers. They are then sent to the depot at Blackwall and placed under the orders of the Superintendent there. They are carefully trained in the use and care of lamps and all light-house apparatus, including meteorological instruments, the keeping of the light-house journal and accounts, and the general management of affairs at a light-house. A certificate of the lowest grade is given for competency in their duties. A second course of instruction includes the use of tools and plumbing, that he may be able to make minor repairs, and also the management and general knowledge of the steam-engine. A third course teaches the management of the magneto-electric machine and lamp, and the fourth course the use and management of fog-horn apparatus. Separate certificates are given for each course.

There are always eight of these candidates for light-keepers positions at Blackwall and two at South Foreland, the latter for instruction in the management of electric-lights, and to the great care taken in their selection and to the thoroughness of their instruction is to be attributed the excellent condition and efficiency of English light-houses.

The keepers and supernumeraries are supplied with neat uniforms; the supernumeraries are paid $225 per annum, and on receiving four certificates and giving satisfactory proofs of steadiness and sobriety they become entitled to an assistant-keeper's pay.

The rates of pay differ, depending upon whether the keepers are insured or not, as will be seen from the following table:

RATES OF PAY.

Grade of Keeper.	Gross rate per annum.	Deduct insurance.
Principals who have served as such above 10 years, if insured	$360.00	$15.00
Same if uninsured	350.00	
Principals, above 5 and under 10 years, if insured	340.00	15.00
Same if uninsured	332.00	
Principals under 5 years, if insured	330.00	15.00
Same if uninsured	322.00	
Assistant-keepers who have served as such above 10 years, if insured	290.00	15.00
Same if uninsured	282.00	
Assistant-keepers, above 5 and under 10 years, if insured	280.00	15.00
Same if uninsured	272.00	
Assistant-keepers under 5 years, if insured	270.00	15.00
Same if uninsured	262.00	

When no longer able to do service, keepers are pensioned, the pension being computed on an estimated allowance of $90 in addition to the above scale.

Flag-staffs are provided at each station, placed either on the tower or in the grounds surrounding it; from which is displayed the Trinity-House flag on Sundays, holidays and whenever the light-house tenders are seen approaching the station. At stations where there are detached dwellings, each keeper is furnished with a living-room, three bedrooms, a scullery, wash-room, a place for coal, and if the site permits, with a garden. A certain amount of standing furniture is provided. Small libraries are provided at each station for the use of the keepers and their families; these libraries are interchanged between the stations on the annual visits of the supply-vessels, medicine-chests are also supplied.

SPAIN.

In Spain the system of administration is the same as that of France. They form a part of the especial branch of public works and depend on a general board of direction established at the Department of Public Works. To this board is attached a permanent commission, composed of engineers of high rank, of the Corps of Roads, Canals and Ports, and of officers of the Royal Navy of like rank, who are always consulted when it is intended to modify or vary the general plan of lighting, or to establish some new light in which the site of the light-house, its height above the sea and its distinctive characteristic. In all else the construction, establishment and repair of light-houses appertain to the engineers who are distributed in the provinces; they and their works are usually visited at stated periods by their immediate superiors who are also engineers with the title of Inspectors, and who form a superior class of the corps. Their duties, powers and responsibility to each other and to the Government are entirely analogous to those which are established in France.

With regard to the lights and beacons, the captains of ports are required to watch their effects and to report to the engineer, and also, if they think necessary, to the chiefs of the Marine Department, so as to secure the adoption of such improvements as may prove desirable.

A special tax is collected, the product of which is applied to lighting the coasts; but the revenue thus derived enters at once into the public treasury, and the liabilities for each year, whether for new works or for the maintenance, lighting and service in general, are met by drafts on the credits opened by the budget of the State.

DENMARK.

The light and buoy service of Denmark is placed under the superintendence of the Ministry of Marine, who decides directly upon everything concerning the personnel, the establishment of new lights, the alteration of old ones, and upon all matters relating to the development of the light and buoy system.

The necessary funds are obtained by appropriation of the Legislature, "The Council of the Realm." There are two kinds of expenditures, the first for ordinary expenses for the maintenance of existing lights, the second for the erection of new lights and for works of considerable magnitude.

There are two kinds of lights, Governmental and Communal: all "sea-lights" are in the first class, and are maintained by the Government. In the second class are small lights placed at the entrance to roadsteads or harbors, and maintained by the respective communities. The light-house inspectors are naval officers, and receive pay and allowances as such.

A first-order light has three keepers, second, third, fourth and

fifth-order lights two keepers each, and sixth-order lights one keeper. The number of keepers is sometimes augmented when the light is situated on isolated points or uninhabited islands. At sixth-order lights, where the nature of the service does not prevent, the keeper is allowed to have other occupation in addition.

HOLLAND.

The management of the coast lights, buoys and beacons of Holland is solely in the hands of the Government, and rests with the Ministry for the Marine, under whom there is an inspector-general and seven inspectors for as many districts, who are charged with the direction and superintendence of their branch of the service. The cost of construction and maintenance is placed yearly on the list of Government expenses.

The harbor lights being generally of only local importance are excluded from the care of the Government, being under the direction of the communities where they are situated. Plans and specifications for the construction of light-houses are furnished by the Government, and the work is let by contract to the highest bidder.

There are no general instructions for the district inspectors. The regulations conform to the local circumstances of each district.

In addition to the inspections by district inspectors, a general inspection is made by the inspector-general at times not stated.

Buoys and beacons are maintained by contract.

BELGIUM.

The construction of Belgian light-houses and harbor-lights is part of the general administration of roads and bridges (*Ponts et Chaussées*) under the superintendence of the Minister of Public Works. An annual sum is appropriated for repairs and maintenance.

The care of the light-houses is intrusted to the navy after they have been built by the engineers of the Ponts et Chaussées. The navy is under the control of the Minister for Foreign Affairs, and the "budget" includes each year the sum necessary for supplies and salaries.

The light-houses on the coast of the North Sea are under the authority of the Inspector of Pilotage at Ostend.

The inspectors of pilotage see that the lights are lit at the proper hours, and are kept in an efficient condition. The keepers, watchmen, etc., are under the orders of these inspectors who have the right to suspend them for five days; heavier punishments are inflicted by the General Director of the navy, which can only be remitted by the Minister.

Light-house apparatus is purchased by the Department of Public Works from those makers who seem to offer the best guaranty.

The Departments of Foreign Affairs and of Public Works consult together concerning any proposed changes in the lighting of the coasts.

AUSTRIA.

The superintendence of all the Austrian light-houses, buoys and beacons belongs to the Imperial Royal Admiralty.

The deputies of the Exchange at Trieste attend to the management of light-houses and instruct their inferiors. The duties of these deputies include the erection of light-houses, repairs, salaries of keepers and their discipline; they also collect light-house taxes and appoint the keepers.

All taxes levied on commercial vessels belong to the Treasury of the deputation of the Imperial Exchange Commission, in order to pay for the lights and all necessary expenses, repairs and renovations.

Every renovation or alteration of a light is first submitted for approval to the Admiralty by the Commission of Exchange, and the necessity for a new light is investigated by a commission.

(To be continued.)

MEDIÆVAL HOUSES.[1]—III.

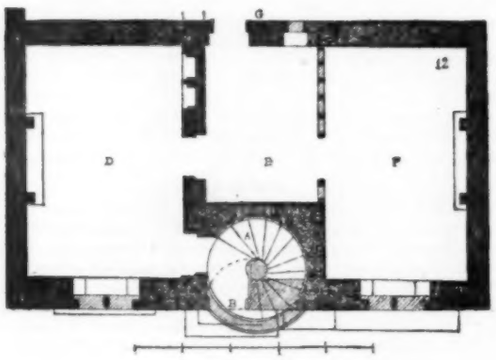


Fig. 12.

THE influence of the different schools of art of the provinces was as strongly felt in these dwellings as in the churches and public buildings. A house of Bourgogne is not quite the same as a house of Aquitaine, of the Isle de France, or of Normandy.

[1] Translated from the French of Viollet-le-Duc, by Mr. A. B. Bibb. Continued from page 309, No. 653.

The special peculiarity of the Burgundian house, found nowhere else, was the spiral staircase built upon the street front, and making a vestibule for the ground floor.

At Avallon, at Flavigny, in the little town of Semur in Auxois, and even at Dijon, there are still to be seen the remains of houses planned as shown in Figure 12. In the middle of the front is the staircase, *A*, corbelling out above the entrance-door, *B*; to the left or right, according to the enclosure of the staircase, is the door, *C*, opening into the first room, *D*, which communicates with *E* and *F*, the plan being the same on each floor. From the middle room *E*, which is an ante-room separating the salons *E* and *F*, there is an exit to the court or garden. An elevation of the street-front is given in Figure 13.

The entrance-door *B*, is sheltered by the overhang of the staircase, whose outer wall is carried on the ends of the steps which

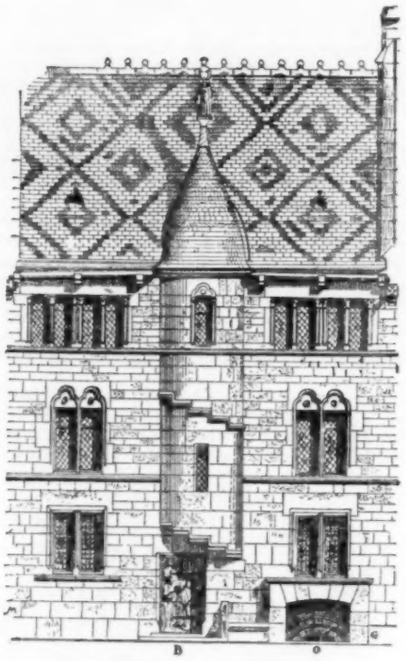


Fig. 13.

form corbelling upon the front: the entrance to the cellar, *O*, is practically under the sill of one of the windows on the ground-floor. The cellars in Burgundy, have always been an important feature.

The plan of this house was simple, economical and roomy. On the first and second floors *E*, was an ante-room between the salons *D* and *F*.

Burgundy furnished a very excellent hard stone strong enough to

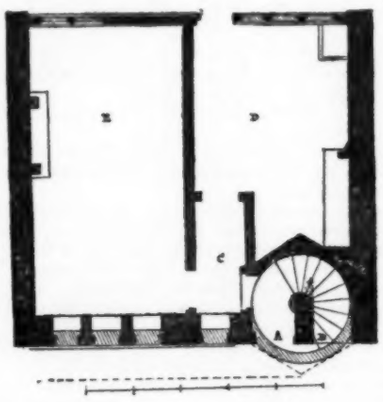


Fig. 14.

carry the small stair-tower, built in a curious manner on the outer end of the steps of the first turn.

The dwelling of this epoch in each province had a certain general plan common to all and adapted to the social requirements of the time, but, in the details, such as the shape and position of the openings, and that sort of thing, there was great variety.

The period was distinguished for great individuality of thought; every one consulted his own tastes or his personal wants in preference

to merely imitating his neighbor. No municipality had then conceived the idea of imposing on all the proprietors in the same street a uniform style of architecture. In those times of reputed great oppression, no authority had yet tried to mould the dwellings of a thousand citizens after a common type. Each man's consciousness of his own individuality and personal responsibility was too great for him to suppose, for an instant, that men would allow themselves to be enclosed, like animals in a zoological garden, in barracks of a uniform style, designed only to please the eye of the sightseer.

Stone gutters inclining toward two different gargoyles and carried on projecting brackets appear in the elevation, Figure 13. This arrangement is still common in Burgundy and in upper Champagne, where long and durable stones for the gutters may be had. Elsewhere hollow beams, or planks covered with lead, are used. From the middle of the thirteenth century, in Burgundy and in Champagne, water from the roof was discharged through projecting gargoyles.

Several charming houses of the thirteenth and fourteenth centuries, standing at Vitteaux (Côte-D'or) some years ago, have been almost all demolished or altered. One of them, dating from the second half of the thirteenth century, shows in plan the following arrangement on the ground floor (Fig. 14): At *A*, under the enclosure of the staircase is the entrance-door, as in the preceding example. The door of the cellar opens on the street at *B*. The entrance-door opens into the little vestibule *C*, from which one passes straight on to the kitchen *D*, or, turning to the left, enters the salon. The plan is repeated on the first floor and gives two chambers; while in the second, under the roof, is a large space divided in the middle of the building.

The elevation (Fig. 15) shows, at *A*, the entrance-door, and, at *B*, the door of the cellar. The stair-tower is no longer carried on the ends of the steps, but on a flat and well-proportioned stone band. At the top the stair-tower loses the cylindrical form and becomes hexagonal, doubtless to lessen the difficulties of covering the roof.

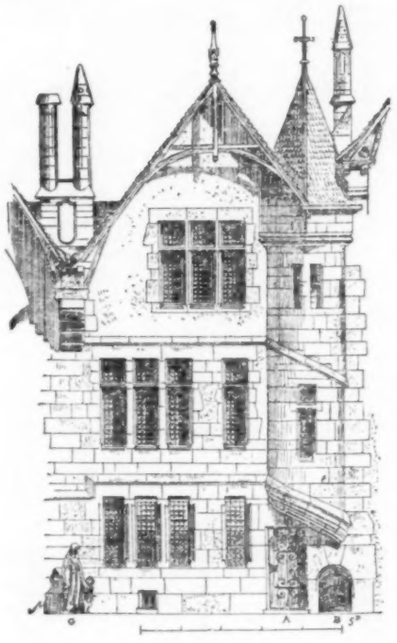


Fig. 15.

An interior court, or more often a little garden gives air and light to the kitchen and the back part of the salon.

The projection given by the corbelling of the stairs and a bracket, reinforced by an iron stirrup, support a heavy overhanging roof which shades the whole front. Water falling into the gutters is discharged at the left on the street by a wooden gargoyle, and on the right into the court through a wooden pipe, falling into a little stone reservoir at the corner of the kitchen. On the ground floor and the first story, the chimneys are on the side walls, their tops being visible in the elevation.

Thus in a space of about 100 metres, of which 49 metres were reserved for the building, the architects of Vitteaux succeeded in building a comfortable, healthy, well-lighted and sufficiently roomy dwelling, of moderate cost.

Only the front and side walls are of masonry, and the floors are carried on the two side walls and on the wooden partition in the centre.

A building of this character and style would cost, including the cellar, 250 francs to the square metre; or in all 12,250 francs, in the provinces.

The houses built to-day in the small towns of the Departments, cost more, are less healthy and commodious, and are remarkably ugly imitations of the large "bourgeois" houses of the cities.

There was no richness of ornamentation in these buildings, and they were generally entirely without carving previous to the fifteenth century; nor had they the vulgar symmetry so much prized by the modern magistracy. What pleases and charms us in these modest dwellings, is the impression of the satisfied wants and habits of the family which they sheltered; the sincerity of their construction, the forethought, skill and spirit with which the architect has profited by the various accidents of the given problem.

Were one of our modern cities to be buried in ashes, like Pompeii, it would be very difficult for the archæological discoverer, two thousand years hence, to get an idea of the tastes, manners and habits of the generation which had built them; if, on the contrary, we go into a fairly well-preserved house of the Middle Ages, everything speaks of the life of its former inhabitants, whom we find to have been people of distinctive character and varied tastes, with their own traditions and tendencies.

The hôtels of the lords, and the houses of the rich and influential commoners, were distinguished unmistakably from the dwellings of the commercial or manufacturing citizens. The latter built their fronts upon the street, while the houses of the nobles and great commoners were retired from public gaze behind blank walls.

The Marquise of Rambouillet has been credited with originating the plan of placing the house between the court and the garden.

Talleyrand des Reaux, who alone among the contemporaries of the Marquise, speaks of the pains she took in the building of her hotel, does not say a word of this invention of hers; and the hôtels built long before her time completely disprove it.

The hôtels of Saint Pol, Tournelles, Bourbon, Tremouille, Sens, Guise and of Cluny, at Paris, were, and still are, between the court and the garden. The houses of the commoners themselves differed in style according to the social status of their owners. The houses of the manufacturing, or mercantile towns of Beauvais, Amiens, Reims or Troyes were unlike those of towns inhabited by land-owners living on their rents, or by wine and grain merchants. The commoner's house in Rheims or Troyes opened on the ground-floor, and had a porch where the merchants chatted over business and other matters, whereas, in Provius or Laon, there was usually a solid wall on the street-front as high as the first floor.

[To be continued.]

COMMUNICATIONS.

A CORRECTION.

PHILADELPHIA, PA., Sept. 3, 1888.

TO THE EDITORS OF THE AMERICAN ARCHITECT:—

Dear Sirs,—We regret very much to see in our advertisement "Are You Aware" which appears in your issue of September 1st, that you have made a bad typographical error in the 6th and most important paragraph, wherein you show that our "Gilbertson's Old Method" IC 20 x 28 plates weigh only 220 lbs. when it should read 240 lbs. This is not a mere typographical error that can be passed over like some others, but it so happens that the whole force of the "ad" rests immediately in the figures referred to, and we would much rather the "ad" should *not* be read at all than read in this shape. In other words, as it stands, it does *us a positive injury*, and we write now to ask you that you call attention to this error in your next issue. Yours very truly, MERCHANT & CO.

THE EFFECT OF LEAD PLATES IN MASONRY.

WASHINGTON, September 4, 1888.

TO THE EDITORS OF THE AMERICAN ARCHITECT:—

Dear Sirs,—On page 102 of your journal, just received, attention is called to the results and conclusions of tests by General Gillmore on the nature of the bearing-surfaces against the material (stone) tried for compressive strength. It will be of interest to compare with them similar observations of a commission engaged in the year 1855, in testing marbles for use in the extension of the United States Capitol, as communicated to the "American Association for the Advancement of Science," in a paper read by Professor Jos. Henry, Secretary of Smithsonian Institution:

"The specimens (cubes of 1½ inches in dimensions) were placed between two thick steel plates, and in order to insure an equality of pressure independent of any want of perfect parallelism and flatness on the two opposite surfaces, a thin plate of lead was interposed above and below between the stone and the plates of steel, as done by most experimenters in researches of this kind. Some doubt, however, was expressed as to the action of interposed lead, which induced a series of experiments to settle this question, when the remarkable fact was discovered that the yielding and approximately equable pressure of the lead caused the stone to give way at about half the pressure it would sustain without such an interposition. Cubes precisely similar to each other which withstood a pressure of 60,000 pounds and upwards when placed in immediate contact with the steel plates, gave way at about 30,000 with lead interposed. This

interesting fact was verified in a series of experiments, embracing samples of nearly all the marbles under trial, and in no case did a single exception occur to vary the result. The explanation of this remarkable phenomenon is not difficult. The stone tends to give way by bulging out in the centre of each of its four perpendicular faces, and to form two pyramidal figures with their apices opposed to each other at the centre of the cube, and their bases against the steel plates.

"In the case where equable rigid pressure is employed, as in that of the thick steel plates, all parts must give way together. But in that of a *yielding* equable pressure, as in the case of interposed lead, the stone first gives way along the outer lines or those of least resistance, and the remaining pressure must be sustained by the central portions of the vertical axis of the cube."

After this important fact was clearly determined, "lead and all other interposed substances were discarded."

The commission who thus broke with the practice of Rondelet, Vicat, Rennie, etc., consisted of savans of whom this country may well be proud. Besides Henry, there were General Totten, Professor Bache, of the Coast Survey, and Captain Meigs. The writer of this served as assistant to arrange details, and devised a method for bringing the upper and lower surfaces of the cubes into perfect parallelism. The upper and lower surfaces of an iron frame were wrought into perfect parallelism by a planing-machine. A row of six specimens were fastened into this by a screw at the end, a small portion of the upper and lower parts were left projecting and ground down to a flat surface until the iron and the face of the cubes were thus brought into a continuous plane. Care was taken that the surfaces thus reduced to perfect parallelism were parallel to the natural bed of the stone, so as to preserve the actual exposure in properly laid cut stonework. The crushing forces recorded before that time were evidently all too low.

Professor Bauschinger, in charge of the mechanico-technical laboratory and testing-station for building-materials in Munich, has made the most exhaustive tests of the compressive strength of building-stones, in the years 1874–76, in which he has made use of the direct pressure of thick steel plates without interposed yielding surfaces.

Adolf Cluss.

NOTES AND CLIPPINGS

Concrete for Strasburg. — About 700 men are now constantly employed in the famous quarries of red sandstone near Saverne, where concrete is manufactured for the extensive new fortifications of Strasburg and Metz. The German experts regard this concrete as the best possible material for such work, and the French have adopted it since the success of the elaborate experiments at Chalons. — *London Truth.*

Pictures from the Tailor's Standpoint. — The organ of the London tailors, the *Drapers' Record*, has taken to art criticism from a tailor's point of view and has examined the pictures of the Royal Academy. The verdict is that but one or two artists have painted their sitters' clothes so that the material can be recognized. Burne Jones is the only one who receives unqualified praise. Poynter is complimented "in the name of the drapery trade," but in his portrait of the Earl of Harewood he has put "an outside breast-pocket on the right side of his Lordship's coat." Holl's picture of Earl Spencer in a coat with an Astrakhan lining is pronounced "a miserable failure. It looks more like moreen than fur." Another "very bad example" bears a nondescript "something" round the neck "supposed to be like sable." Another picture contains "shaggy-shoddy something unlike anything the critic has ever met with in the drapery world." As to "style, fit and fashioning," the report is decidedly unfavorable. For "the furnishing and upholstery departments," though, much approval is expressed. — *The London News.*

Shall St. Paul's remain a Religious Edifice. — Referring to an incident quoted in connection with Lord Carnavon's proposal to keep the churches open all day and every day, a correspondent of the London *Times* says: "It is in some respects, curiously like Sydney Smith's description of St. Paul's in 1837, the opening of which at other times than during Divine service he vehemently opposed I quote from a six-penny pamphlet, published by the Free and Open Church Association, of papers read at the Wakefield Church Congress of 1886 (p. 12), referring to a House of Commons Return as to the Free Admittance to Public Buildings (Febuary 6, 1838). "The Dean and Chapter claim an entire right of shutting the doors of the church after the services of the church are finished. All churches in England are shut when the service is over: and whoever wishes to see any church at any other period must find out the officer of the church and give him a fee for his trouble. There pass by the gates of St. Paul every day about 100,000 persons, and on days of more than ordinary excitement and bustle in the city more than double that number. If the doors of the church were constantly open, such numbers would come that all idea of performing the service would be entirely out of the question. It has happened in less than an hour between 2,000 and 3,000 people have entered the church, many of them of the lowest description, with their hats on, laughing, talking, eating, and making an uproar, totally incompatible with any idea of religion. . . . If the doors of St. Paul's were flung open, the church would become, as it has been in times past, a place of assignation for all the worst characters, male and female, in the metropolis; it would be a royal exchange for wickedness, as the other Royal Exchange is for commerce. Even now, with the restricted right of entrance, we see beggars, men with burdens, women knitting, parties eating luncheon, dogs, children playing, loud laughing and talking, and every kind of scene incompatible with the solemnity of worship. The mischief and indecorum which takes place at St. Paul's are very notorious; the Cathedral is constantly and shamefully polluted, and the prayer-books torn up; the monuments are scribbled all over, and often with the grossest indecency. The inference from these observations is that the right of entry must be restricted, or St. Paul's must be opened as a gallery of sculpture, and shut as a place of worship."

TRADE SURVEYS

Two points are to be noted which have been silently working in the direction of an enlargement of our trade foundations. One is the vast expansion of our interior markets, the second is the crowded production that has been maintained in manufacturing establishments everywhere. The most careful observers of trade and trade movements who have recently returned from the far West and the South express the greatest surprise at the extent of the first cause referred to. New markets are springing up in fifteen or eighteen states at a surprising rate. When railroad building fell off the business world held up its hands in surprise. That stoppage amounted to but little. It permitted capital, enterprise and labor to rush in and fill up the field which railroad construction has opened. It has been doing this right along. The expenditures that have been made in these new sections of the country are merely preparatory to greater expenditures later on. Where twelve months ago there was one enterprise involving an outlay of $5,000 to $50,000, there are now two enterprises involving an outlay of great sums. For this reason the country is stronger. Its prospects are brighter, it has wider enterprises, to-day has more opportunity than twelve months ago, or at any time in history. Capital, also, has more opportunity. A good many journalists and so-called staticians and economists are making a great furore over the enormous indebtedness which new sections of the country have contracted and draw from this predictions of evil. The people of the West would not borrow unless they needed money. This idle money from the East is accomplishing miracles in the West. It is laying the foundation that will develop valuable markets for our manufactured products. Travelling-agents from our Eastern States who have been making careful tours of observation this season justify the statement that a vast market is being opened up for manufactured products in the new regions of country penetrated by the railroad construction of the past three years. Agents for lumber firms doing business in Chicago and Tennessee have recently furnished the information that the prospects for lumber in the Mississippi region are brighter than ever. What is wanted, they say, is that railroads should make cheaper freight rates, and in some cases quicker transportation. The lumber manufacturers in all sections of the country entertain very encouraging views as to the future. The requirements for all kinds of lumber are steadily increasing even in the East. There is no appearance of a glut in any department. New stumpage is being bought up. Valuable timber lands are being purchased along new projected roads. The value of standing timber has increased in a number of localities where railroads and water facilities offer continuous and cheap shipment. The lumber trade in general is in a good condition. There is a shortness in the supplies of logs in Southern rivers. Trade throughout the Northeast is reviving. The building industry is being actively prosecuted. Business in lumber in Minneapolis, St. Paul and Kansas City and the far South is heavy. Southern yellow-pine is crowding itself into all markets West and East. Northern capital has not been idle this season in picking up land in desirable tracts just as Pennsylvania iron capital has been interesting itself in Southern iron making. The only encouraging feature is the reaction of saw-mills and planing-mills, not only in the South but in the regions along the Northern border.

The manufacturers of saw-mill machinery have been only moderately busy this year, but recent reports state that the mill-capacity will be crowded with work from this out. The iron trade presents no new features. Throughout the Ohio and Mississippi Valleys there is great activity. East of the mountains trade is sluggish. There are no signs of increasing activity in railroad-building for this year. In financial circles in New York and Boston great railroad schemes are being nursed. It is the opinion of financiers in this section that a great deal of new work will be undertaken next spring. There will also be a great deal of small railroad-building to develop the territory by which profitable returns will be realized much quicker than is possible than with long lines where traffic alone is relied upon. In other words, a great deal of railroad-building will be done in 1889 for the purpose of selling the territory developed. This will be the key-note to railroad-building for some years to come. There is a demand for agricultural land, and railroads will penetrate those sections. There is an urgent demand for mineral territory, and there are scores of enterprises now waiting which will be carried through for the purpose of selling the minerals which can be reached and sold. This spirit of enterprise is what controls all our railroad enterprises Hence it is that we hear of large land-purchases in the far off places. Railroad-builders intend to profit by the value which their enterprise will give to the surrounding land. The smaller industries are feeling the effects of September trade. Throughout the New England States there is very little dulness among manufacturers. Carriage-builders claim that they have had an exceptionally good season. Paper-makers point out a declining tendency in the prices of paper. Boot and shoe manufacturers are very busy, and feel that there is less trouble from competition in the struggle for trade. The cotton-goods manufacturers expect to put in a busy winter. The woolen and worsted interests are disheartened over the existing conditions and trade prospects. The electrical interests feel that they are now in a position where their inventions and improvements will be more promptly accepted by capitalists, and that work will be more abundant. The manufacturers of cast and wrought pipe have been picking up a good many orders during August to supply material for water, gas and steam-using purposes. There is still a good deal of uneasiness among mill-men and transporters. Railroad managers are not satisfied with the freight rates, and mill-men are not satisfied with margins. The latter are maintaining very rigid rules in respect to credits. Both these great interests, however, recognize that the evolution going on will place our railroad interests on a firmer foundation, and that a demand for all kinds of products by another year will have extended to a point where the productive capacity of the country will be more steadily employed than it has been this year.

S. J. Parkhill & Co., Printers, Boston.